State of California
California Environmental Protection Agency

AIR RESOURCES BOARD

Emission Reduction Offset Transaction Cost Summary Report for 1999

May 2000

Prepared by

Regulatory Assistance Section
Project Assessment Branch
Stationary Source Division

ACKNOWLEDGMENTS

Air Resources Board Staff:

Norman P. Marquis, Air Pollution Specialist
Beverly Werner, Manager
Regulatory Assistance Section
Stationary Source Division

The data for this report was compiled from information provided by
all Air Pollution Control/Quality Management Districts
in California

Table of Contents

EXECUTIVE SUMMARY

In 1992, the California Legislature passed AB 3785 (Quackenbush) that amended Health and Safety Code Sections 40709 and 40709.5 and the Government Code Section 6254.7(f) requiring local air quality management districts / air pollution control districts (AQMDs / APCDs or districts) to collect information about the cost of offset transactions from stationary source owners who purchase offsets as required by district New Source Review programs. These changes in State law also require all districts to adopt emission reduction credit banking programs. Districts are required to collect specific information about offset transactions including the price paid in dollars per ton, the pollutant traded, the amount traded and the year of the transaction. Districts are also required to annually publish this information without revealing the identity of the parties involved with the transaction.

The Air Resources Board (ARB) has compiled information regarding offset transactions collected from all 35 districts and has assembled it into this report summarizing statewide emission reduction offset transactions in California for the year 1999. All the districts reported to ARB regardless of whether they had any offset transactions. A total of 289 transactions (twice that of 1998) were reported to have taken place in California in 1999. In this report we are not including information on 29 reported transactions involving PM or TSP, or barter or subsidiary transactions. Of the remaining 260 transactions , 64 were for NOx, 103 were for HC, 57 were for PM10, 24 were for CO, and 12 were for SOx.

Table 1 presents the average, median, high and low costs for NOx, HC, PM10, CO, and SOx offsets reported in 1999. For a specific breakdown of all transactions by district, see Table 2.

Table 1
1999 Prices Paid in Dollars Per Ton for Offsets

	NOx	HC	PM10	CO	SOx
Average (mean)	$13,884	$6,579	$10,400	$3,033	$4,864
Median	$10,925	$4,931	$11,111	$3,333	$5,100
High	$45,000	$28,334	$16,800	$8,015	$9,200
Low	$913	$913	$500	$278	$913

The districts which reported offset transactions included: Bay Area AQMD, Feather River AQMD, Imperial County APCD, Kern County APCD, Monterey Bay Unified APCD, Sacramento Metropolitan AQMD, San Diego County APCD, San Joaquin Valley Unified APCD, Santa Barbara County APCD, South Coast AQMD, Ventura County APCD, and Yolo-Solano AQMD.

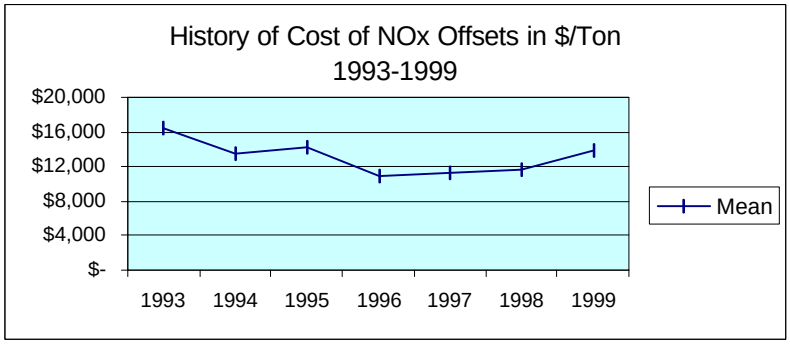
Some points of interest to note from Table 2, which begins on page 9, are that in 1999 over half of all transactions occurred in the southern part of the state, which also had significantly higher cost per ton of NOx than northern or central California. The central area of the state had the lowest number of transactions, and tended to have lower cost per ton of all the pollutants reported.
For the past seven years (1993-1999) we have collected and reported statewide data on the number and cost of offset transactions. We have seen the number of transactions increase from 30 in 1993 to 260 in 1999. The number of districts reporting offset transactions during this period ranged from five to nine, but in 1999 there were 13 districts reporting offset transactions. Offset transactions have increased throughout the state.

During 1993 through 1997 it appeared as though the cost per ton of NOx was decreasing. However, 1998 and 1999 showed significant increases in the highest cost of NOx offsets and a slight increase in the average price paid. The average cost per ton of HC does not show any significant trends. The prices seem to fluctuate, up one year and down the next. The average cost per ton of PM10 has come down slightly in the past two years.

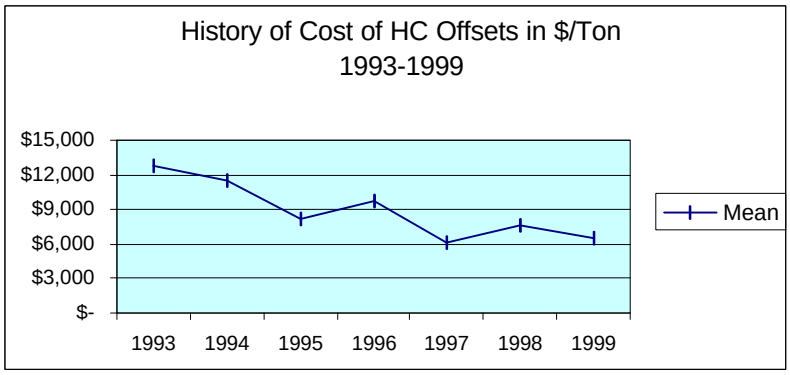
Summary Charts A, B, and C illustrate the trends that have occurred during the past seven years for the average (mean) cost per ton of the three most active criteria pollutants (NOx, HC and PM10). Summary Chart A illustrates that the average cost of NOx emission credits was decreasing in price till 1996, but starting in 1997 the price of NOx has slowly increased through 1998 and 1999. Summary Chart B illustrates that the average cost of HC emission credits decreased in price from 1993 through 1995, but since then the price of HC fluctuated up and down, but has remained lower in cost compared to 1993 through 1995. Summary Chart C illustrates that the cost per ton for PM10 gradually fell from 1993 through 1995, and has remained fairly constant in average cost from 1995 through 1999, with the exception of 1998 which saw a dramatic increase. The cost came back down in 1999.

Summary Charts D and E illustrate the trends for the number of transactions and the number of tons traded during the past seven years by the three most traded pollutants (i.e. NOx, HC and PM10). Summary Chart D illustrates that the number of transactions since 1993 have increased steadily for NOx and PM10, however, HC transactions have increased more dramatically. Summary Chart E illustrates that the number of tons traded of NOx, HC and PM10, have also increased steadily since 1993, with HC showing the most tonnage traded.

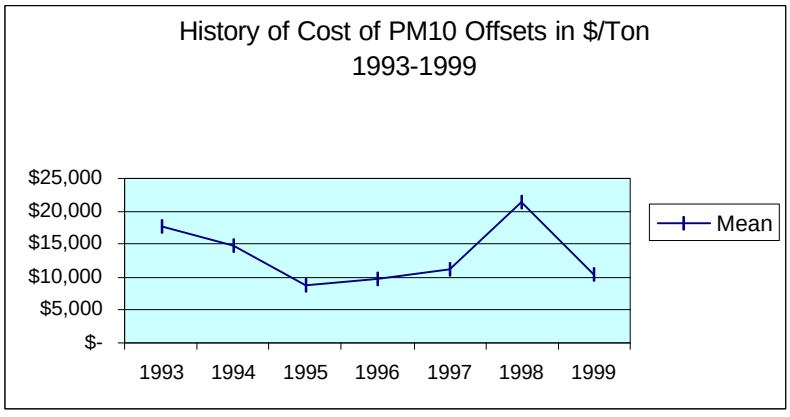
Summary Chart A



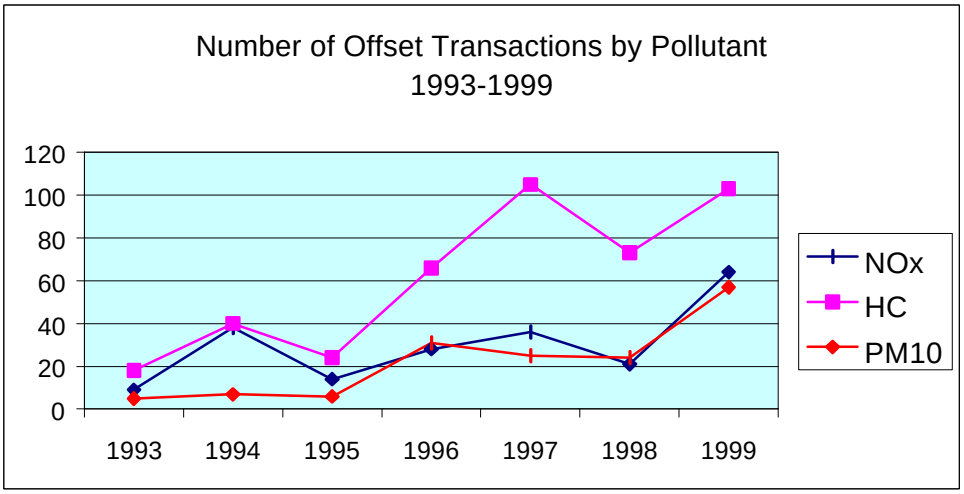
Summary Chart B



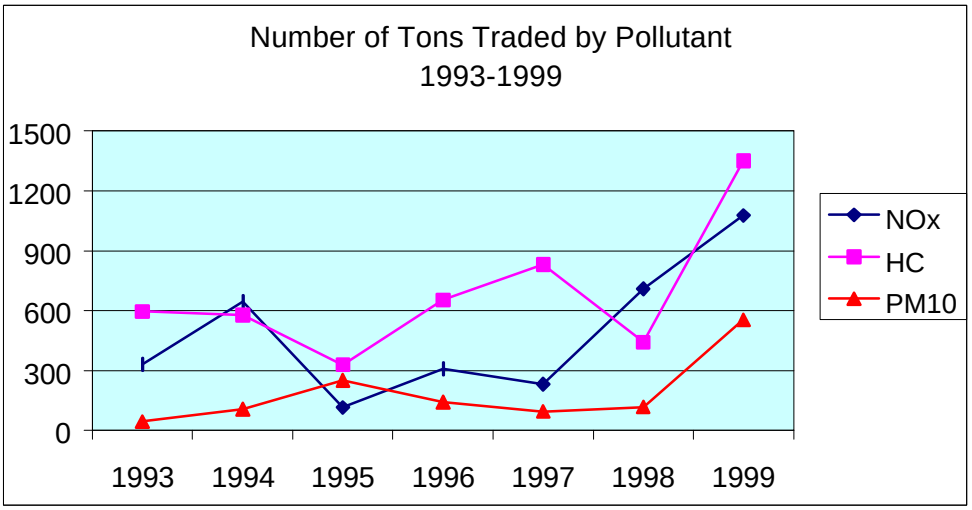
Summary Chart C



Summary Chart D



Summary Chart E



INTRODUCTION

Section 40709.5(e) of the Health and Safety Code mandates that local air quality management and air pollution control districts (districts) collect information regarding the cost of offsets from stationary source owners who purchased offsets as required by district New Source Review programs. This report presents a compilation of the transactions in California from January 1 through December 31, 1999 as supplied by the districts. Reports from previous years have been included in the appendices for comparison.

This report does not attempt to analyze the cost data collected or attempt to predict future prices or offset availability. As required by Section 40709.5(e), this report does not contain information that identifies the parties involved in the transactions.

Emission reduction credit transactions play a role in California's efforts to promote economic growth while protecting public health and the environment. The use of emission reduction credits to offset emissions from new or modified sources gives industry flexibility to mitigate emissions in the most cost-effective manner available.

This report may be used as a tool by interested parties to evaluate the price paid for offsets in 1999 (and prior years). The report will also give a sense of the number of transactions taking place in California's emission credit market and the associated trends relating to cost. By informing interested parties about emission reduction credit costs, future credit transactions may be facilitated.

We have not included RECLAIM Trading Credits from the South Coast Air Quality Management District's RECLAIM program because they are not comparable to emission reduction credits.

Also, our tables and calculations do not include data on the cost of leasing credits from the SEED (Solutions for the Environment and Economic Development) program of the Sacramento Metropolitan Air Quality Management District.

NEW SOURCE REVIEW AND CALIFORNIA'S AIR QUALITY MANAGEMENT PROGRAM

The responsibility for controlling emissions from stationary sources of air pollution rests with California's local districts. The California Clean Air Act requires districts to adopt a New Source Review permitting program that results in no net increase in emissions from new and modified stationary sources which have the potential to emit over a specified amount of nonattainment pollutants or their precursors. As part of New Source Review, stationary sources may be required to apply the Best Available Control Technology (BACT) to reduce emissions and, in some cases, to provide emission reduction offsets to mitigate the impact of emissions from the source remaining after the application of BACT. These emission reduction offsets are sometimes called emission reduction credits. To be used as mitigation, offsets must meet certain criteria: the emission reductions must be surplus to any federal, state or local laws or regulations; and must be enforceable, quantifiable and permanent.

Emission Reduction Credit Banking and Trading:

Emission reduction credit banking is defined as "a means by which emission reductions may be banked or otherwise credited to offset future increases... or a calculation method which enables internal emission reductions to be credited against increases" (Health & Safety Code Section 40709.5). Once created, emission reduction credits may be banked with the district for future use by the source that generated them, used concurrently to offset new projects, or sold to other sources for use as mitigation.

The most common method of creating emission reduction credits is to control or curtail the emissions from an existing stationary source. Control of emissions is generally from the application of emission control technology not required by any regulation or rule. Curtailment could be from a change in operating hours of a source, or through the shutdown of a source. Another method of creating emission reduction credits is to reduce emissions from mobile sources. The procedures for generating these credits are outlined in the Air Resources Board's Mobile Source Emission Reduction Credits: Guidelines for the Generation and Use of Mobile Source Emission Reduction Credits. Additionally, credits may be generated from the reductions in emissions from eliminating the burning of agricultural wastes. In all cases, credits must be generated pursuant to district rules and regulations, and must be reviewed and certified by the district to be used as mitigation. The legal requirements of credit generating programs are specified in the Health and Safety Code and further defined by rules in place in each district.

Example: Siting a New Stationary Source in California:

A new stationary source that locates in California is required to apply for an authority to construct permit and a permit to operate from the local air quality district. As part of the district's New Source Review (NSR) process for granting of permits, the source is required to demonstrate that it meets the district's NSR rules regarding Best Available Control Technology and emission offsets. Unlike the Federal NSR program which is based on net emission increases at a source, in California, if the potential to emit nonattainment pollutants or their precursors of a new or modified facility is equal to or above a level specified in State law, the facility will be required to provide offsets (e.g. no net increase in emissions are required for sources with the potential to emit 10 tons per year for a severe nonattainment district up to 25 tons per year in a moderate nonattainment district).

REQUIREMENTS TO REPORT COST OF OFFSETS

Section 40709 of the Health and Safety Code requires all districts to establish banking programs for emission reduction credits and establishes a mechanism for districts to collect data regarding the price paid for offsets. The text of Section 40709 is in Appendix G. The following is a summary of the requirements of the Government Code and the California Health and Safety Code:

- Section 6254.7(f) of the Government Code authorizes districts to obtain information on cost of offsets from applicants.
- Section 40709 of the California Health and Safety Code makes an emission reduction banking

system mandatory in every district.

- Section 40709(c) of the Health and Safety Code specifies that emission reductions proposed to offset simultaneous emissions increases within the same stationary source need not be banked prior to use as offsets.
- Section 40709.5(e) requires that any district that has established a banking system is required to develop a program which provides the following information as public record:
  - o Annual publication of the costs in dollars per ton, of emission offsets purchased for new and modified emission sources, excluding the identity of the parties involved
  - o The annual publication shall specify for each offset purchase transaction:
    - the date of the offset transaction (year only)
    - the amount of offset purchased by pollutant
    - the total cost, by pollutant of the offsets purchased
  - o Each application for use of emission reductions banked shall provide sufficient information, as determined by the district, to perform the cost analysis

DATA COLLECTION PROCESS

A subcommittee of the California Air Pollution Control Officers Association (CAPCOA) Engineering Managers was assembled to develop a uniform reporting form for collecting data from the districts for this report. Several meetings were held with the subcommittee to establish a form which met the needs of the districts as well as ARB for compilation of the report. The reporting form which was developed and first used in 1994 has been used to collect the data for this report. Also, this report follows a format identical to the one first used in the 1994 report.

The reporting form was designed to transmit information to ARB in such a way as to make the information about the transaction available without disclosing the names of the transaction parties.

The form distinguishes between the methods of generating emission reduction credits. Possible generating methods include stationary, mobile and agricultural offsets. The prices paid for credits may be affected by the type of source from which reductions are obtained. This is particularly true with mobile sources that have a finite life span.

The lifespan of the credit may significantly affect the price paid for offsets. The form allows the district to identify length of useful life if the credit life is limited. Mobile source credits and lease agreement transactions can be distinguished using this section of the form.

The other major distinction on the reporting form involves the type of payment agreement. Possible situations include direct sale of the credit, barter for services or equipment, a transaction between subsidiary parties, or an assets transfer within a company. In each case the type of transaction agreement may affect the price of the transaction.

Knowing these facts about each transaction will aid in analysis of market values for credits by interested parties. A copy of the reporting form and instructions is in Appendix H.

DESCRIPTION OF 1999 DATA

Table 2 presents all of the reported pollutant transactions which took place in the State, listed by individual districts. There were a total of 289 transactions statewide in 1999. Three of these transactions are not reported here because the trades involved particulate matter (PM) or total suspended particulates (TSP). We are only including information on PM10 in this report. In addition, the South Coast reported nine purchases which are not shown in this report. Some of these transactions were emission credits that were purchased as asset transfers to be used in the future or re-sold by offset brokers. The other transactions were credits that were transferred, as a result of a name change in a company. These transactions are not included in Table 2 because they do not represent the final cost paid by an end-user of the offsets. Only credits sold to an end-user are reflected in the data presented.

The majority of transactions reported involved emission reductions from stationary sources. Forty-four of these were agricultural offset transactions. These offsets were created from the discontinuation of agricultural burning. Interestingly, there were no transactions from mobile source emission reductions during 1999. There were also 17 barter transactions in which no exchange of money was reported. Of the remaining 260 transactions, (all transactions that included the exchange of money), 64 were NOx transactions, 103 were HC transactions, 57 were PM10 transactions, 24 were CO transactions, and 12 were SOx transactions. All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1999.

Tables 4, 6, 8, 10 and 12 present information by district for NOx, HC, PM10, CO and SOx respectively. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Barter and subsidiary transactions that do not have an associated cost are listed at the beginning of each district's transactions.

Tables 5, 7, 9, 11 and 13 summarize the data of each preceding table. The summary tables include the average (mean), the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude asset transfer, subsidiary, barter, and other non-monetary transactions where there were no associated costs to include in the calculations.

As shown in Table 5: (64 NOx Transactions)

- the median price per ton of NOx was $10,925
- the average price per ton of NOx was $13,884
- the high price per ton of NOx was $45,000
- the low price per ton of NOx was $913

As shown in Table 7: (103 HC Transactions)

- the median price per ton of HC was $4,931
- the average price ton of HC was $6,579
- the high price per ton of HC was $28,334
- the low price per ton of HC was $913

As shown in Table 9: (57 PM10 Transactions)

- the median price per ton of PM10 was $9,500
- the average price per ton of PM10 was $10,274
- the high price per ton of PM10 was $16,800
- the low price per ton of PM10 was $500

As shown in Table 11: (24 CO Transactions)

- the median price per ton of CO was $3,333
- the average price per ton of CO was $3,033
- the high price per ton of CO was $8,015
- the low price per ton of CO was $278

As shown in Table 13: (12 SOx Transactions)

- the median price per ton of SOx was $5,100
- the average price per ton of SOx was $4,864
- the high price per ton of SOx was $9,200
- the low price per ton of SOx was $913

Charts 1 through 5 are bar graphs that show the number of transactions per cost of a pollutant per ton. These Charts also show the median and average (mean) price paid per ton of pollutant in Tables 4, 6, 8, 10, and 12 respectively.

TABLE 2

1999 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Bay Area	NOx	$3,602	0.601	
Total of 20 Transactions	NOx	$5,714	3.8	
	NOx	$7,500	22.07	
	NOx	$8,000	107.9	
	NOx	$8,015	2.143	
	NOx	$13,589	289.35	
	HC	$3,602	43.819	
	HC	$5,000	18.517	
	HC	$5,714	1.1	
	HC	$6,325	144	
	HC	$8,015	40.97	
	HC	$8,333	19.200	
	PM10	$7,844	98.13	
	PM10	$9,500	21.72	
	CO	$5,714	2.4	
	CO	$8,015	0.357	
	SOx	$2,000	1.3	
	SOx	$2,000	71.59	
	SOx	$5,714	0.2	
	SOx	$6,325	46.3	
Colusa County	NOx		0.226	2-Year Ag. Barter Transaction
Total of 15 Transactions	NOx		0.456	2-Year Ag. Barter Transaction
	NOx		3.842	2-Year Ag. Barter Transaction
	HC		0.821	2-Year Ag. Barter Transaction
	HC		1.354	2-Year Ag. Barter Transaction
	HC		7.411	2-Year Ag. Barter Transaction
	PM10		0.739	2-Year Ag. Barter Transaction
	PM10		1.424	2-Year Ag. Barter Transaction
	PM10		7.944	2-Year Ag. Barter Transaction
	CO		5.914	2-Year Ag. Barter Transaction
	CO		11.557	2-Year Ag. Barter Transaction
	CO		67.82	2-Year Ag. Barter Transaction
	SOx		0.132	2-Year Ag. Barter Transaction
	SOx		0.454	2-Year Ag. Barter Transaction
	SOx		2.147	2-Year Ag. Barter Transaction
Feather River	NOx	$8,000	6.76	
Total of 56 Transactions	NOx	$8,000	7.3	
	NOx	$8,000	9.07	
	NOx	$8,000	11.37	
	NOx	$8,000	21.91	

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Feather River (continued)	NOx	$8,000	33.97	
	NOx	$8,500	41.13	
	NOx	$10,925	0.72	Agricultural Offset
	NOx	$10,925	1.34	Agricultural Offset
	NOx	$10,925	1.35	Agricultural Offset
	NOx	$10,925	2.14	Agricultural Offset
	NOx	$10,925	2.54	Agricultural Offset
	NOx	$10,925	3.48	Agricultural Offset
	NOx	$10,925	4.78	Agricultural Offset
	NOx	$10,925	4.78	Agricultural Offset
	NOx	$10,925	4.78	Agricultural Offset
	NOx	$10,925	4.78	Agricultural Offset
	NOx	$10,925	4.78	Agricultural Offset
	NOx	$10,925	5.46	Agricultural Offset
	NOx	$10,925	6.43	Agricultural Offset
	NOx	$10,925	9.21	Agricultural Offset
	HC	$5,463	0.9	Agricultural Offset
	HC	$5,463	1.6	Agricultural Offset
	HC	$5,463	2.2	Agricultural Offset
	HC	$5,463	2.5	Agricultural Offset
	HC	$5,463	3	Agricultural Offset
	HC	$5,463	4.1	Agricultural Offset
	HC	$5,463	5.7	Agricultural Offset
	HC	$5,463	5.7	Agricultural Offset
	HC	$5,463	5.7	Agricultural Offset
	HC	$5,463	5.7	Agricultural Offset
	HC	$5,463	5.7	Agricultural Offset
	HC	$5,463	7.6	Agricultural Offset
	HC	$5,463	8.3	Agricultural Offset
	HC	$5,463	11	Agricultural Offset
	HC	$8,000	0.1	
	HC	$8,000	0.1	
	HC	$8,000	0.1	
	HC	$8,000	0.52	
	HC	$8,000	5	
	HC	$8,500	20.6	
	PM10	$8,500	28.12	
	PM10	$9,200	0.96	Agricultural Offset
	PM10	$9,200	1.8	Agricultural Offset
	PM10	$9,200	2.86	Agricultural Offset
	PM10	$9,200	2.94	Agricultural Offset
	PM10	$9,200	3.4	Agricultural Offset
	PM10	$9,200	4.66	Agricultural Offset
	PM10	$9,200	6.4	Agricultural Offset
	PM10	$9,200	6.4	Agricultural Offset
	PM10	$9,200	6.4	Agricultural Offset

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Feather River (continued)	PM10	$9,200	6.4	Agricultural Offset
	PM10	$9,200	6.4	Agricultural Offset
	PM10	$9,200	9.31	Agricultural Offset
	PM10	$9,200	9.92	Agricultural Offset
	PM10	$9,200	12.34	Agricultural Offset
Imperial County Total of 8 Transactions	NOx	$913	29.2	
	NOx	$9,500	65.14	
	HC	$913	1.38	
	PM10	$500	1	Agricultural Offset
	PM10	$913	0.79	
	PM10	$1,000	1	Agricultural Offset
	CO	$913	2.39	
	SOx	$913	0.51	
Kern County Total of 5 Transactions	HC	$3,600	12.48	
	HC	$3,600	17.42	
	HC	$3,600	20.62	
	HC	$3,600	24.52	
	HC	$3,600	74.96	
Monterey Bay Unified Total of 10 Transactions	NOx	$4,401	1.268	
	NOx	$4,577	20.169	
	HC	$1,500	18	
	HC	$4,401	0.283	
	HC	$4,577	187.65	
	PM10	$4,401	0.455	
	CO	$4,401	0.257	
	CO	$4,577	2.412	
	SOx	$4,401	0.009	
	SOx	$4,577	2.556	
Sacramento Metropolitan Total of 11 Transactions	NOx	$10,500	2.133	
	NOx	$10,500	10.254	
	NOx	$15,000	0.668	
	NOx	$17,000	13.92	
	NOx	$20,000	0.422	
	NOx	$20,000	0.788	
	NOx	$20,000	2.08	
	HC	$18,000	0.126	
	HC	$18,000	1.233	
	HC	$18,000	1.753	
	HC	$20,000	0.083	
San Diego County Total of 21 Transactions	NOx		12.02	Barter Transaction
	NOx		30	Barter Transaction

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
San Diego County (continued)	NOx	$19,000	23.1	
	NOx	$20,000	5.79	
	NOx	$21,000	1.21	
	NOx	$21,403	1.21	
	NOx	$24,151	2.5	
	NOx	$30,000	8	
	NOx	$32,000	3.3	
	NOx	$45,000	4.4	
	HC	$1,000	15.2	1-Year Lease
	HC	$1,344	1.86	1-Year Lease
	HC	$1,602	1	1-Year Lease
	HC	$6,537	5	3-Year Lease
	HC	$11,000	1.48	
	HC	$12,500	2.1	
	HC	$12,838	1.48	
	HC	$13,790	5.3	
	HC	$16,250	2.4	
	HC	$28,000	17.05	
	HC	$28,334	17.05	
San Joaquin Valley Total of 24 Transactions	NOx	$7,000	9.6	
	NOx	$7,960	8.6	
	NOx	$8,500	4.1	2nd & 3rd Quarters Only
	NOx	$8,500	9.6	2nd, 3rd & 4th Quarters Only
	NOx	$8,500	12	
	NOx	$10,000	83.6	
	NOx	$11,500	5.8	
	NOx	$11,500	7.4	
	NOx	$11,500	35	
	NOx	$12,000	4.5	
	NOx	$16,609	38.1	
	HC	$4,000	16.4	
	HC	$6,100	1.1	
	HC	$6,100	20.2	
	HC	$6,500	13	
	HC	$6,600	2.1	
	HC	$7,960	61	
	PM10	$7,000	0.7	
	PM10	$7,500	25	
	PM10	$7,960	84.6	
	PM10	$16,800	16.5	
	CO	$300	5.8	
	CO	$300	31.4	
	SOx	$5,200	55	

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Santa Barbara County	NOx	$5,000	4	
Total of 11 Transactions	NOx	$5,000	12	
	HC	$5,000	11	
	HC	$7,500	1	
	HC	$7,500	3.2	
	HC	$10,000	1	
	HC	$18,500	3.2	
	HC	$19,425	3.2	
	PM10	$5,000	0.5	
	SOx	$5,000	11	
	SOx	$7,000	2	
South Coast	NOx	$22,222	4.5	
Total of 90 Transactions	NOx	$27,302	2.16	
	NOx	$27,778	1.62	
	NOx	$33,333	0.18	
	NOx	$33,333	0.36	
	NOx	$40,000	0.36	
	HC	$3,056	3.6	
	HC	$3,333	1.44	
	HC	$3,333	1.8	
	HC	$3,333	1.8	
	HC	$3,333	6.66	
	HC	$3,333	36.18	
	HC	$3,433	8.28	
	HC	$3,472	8.28	
	HC	$3,556	7.56	
	HC	$3,567	10.8	
	HC	$3,750	2.34	
	HC	$3,787	68.4	
	HC	$3,833	0.9	
	HC	$3,861	21.78	
	HC	$3,867	4.5	
	HC	$3,889	0.18	
	HC	$3,889	0.54	
	HC	$3,889	0.9	
	HC	$3,889	1.26	
	HC	$3,889	1.44	
	HC	$3,889	1.62	
	HC	$3,889	1.8	
	HC	$3,889	1.8	
	HC	$3,889	1.8	
	HC	$3,889	2.34	
	HC	$3,889	6.48	
	HC	$3,889	9.72	

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast continued	HC	$3,889	15.84	
	HC	$3,889	20.7	
	HC	$3,889	21.96	
	HC	$3,889	37.26	
	HC	$3,889	40.5	
	HC	$3,903	12.6	
	HC	$4,306	2.16	
	HC	$4,306	6.48	
	HC	$4,861	3.6	
	HC	$5,556	8.28	
	HC	$6,944	16.2	
	PM10	$11,111	0.18	
	PM10	$11,111	0.36	
	PM10	$11,111	0.54	
	PM10	$11,111	1.08	
	PM10	$11,111	1.62	
	PM10	$11,111	1.8	
	PM10	$11,111	4.5	
	PM10	$11,111	5.76	
	PM10	$11,111	18	
	PM10	$11,111	29.7	
	PM10	$12,778	1.08	
	PM10	$12,778	1.44	
	PM10	$12,778	2.52	
	PM10	$12,778	47.16	
	PM10	$12,939	17.28	
	PM10	$13,333	0.36	
	PM10	$13,800	1.26	
	PM10	$13,889	0.36	
	PM10	$13,889	0.54	
	PM10	$13,889	1.08	
	PM10	$13,889	10.8	
	PM10	$14,055	2.34	
	PM10	$14,375	0.72	
	PM10	$14,375	2.16	
	PM10	$15,000	0.18	
	PM10	$16,111	2.52	
	PM10	$16,111	3.96	
	CO	$278	0.54	
	CO	$278	3.06	
	CO	$2,583	8.82	
	CO	$2,583	8.82	
	CO	$2,583	19.26	
	CO	$3,194	1.62	
	CO	$3,333	0.36	
	CO	$3,333	0.54	

TABLE 2 (cont.)
1999 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	CO	$3,333	1.44	
	CO	$3,333	2.34	
	CO	$3,333	2.52	
	CO	$3,333	2.88	
	CO	$3,333	4.68	
	CO	$3,333	10.08	
	CO	$3,333	61.2	
	CO	$3,333	120.78	
	CO	$3,750	12.06	
	SOx	$6,042	1.52	
	SOx	$9,200	8.46	
Ventura County Total of 3 Transactions	HC	$2,591	4.4	1-Year Lease
	HC	$10,000	5.5	
	HC	$15,000	3	
Yolo-Solano Total of 3 Transactions	NOx	$8,000	51.55	
	HC	$4,000	12.2	
	PM10	$8,000	19	

TABLE 3

~~Districts With No Offset Transactions to Report in 1999~~

Amador County Air Pollution Control District
Antelope Valley Air Pollution Control District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
El Dorado County Air Pollution Control District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Mojave Desert Air Quality Management District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
Placer County Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Shasta County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District

TABLE 4

1999 California

NOx Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$3,602	0.601	
	$5,714	3.8	
	$7,500	22.07	
	$8,000	107.9	
	$8,015	2.143	
	$13,589	289.35	
Feather River	$8,000	6.76	
	$8,000	7.3	
	$8,000	9.07	
	$8,000	11.37	
	$8,000	21.91	
	$8,000	33.97	
	$8,500	41.13	
	$10,925	0.72	
	$10,925	1.34	
	$10,925	1.35	
	$10,925	2.14	
	$10,925	2.54	
	$10,925	3.48	
	$10,925	4.78	
	$10,925	4.78	
	$10,925	4.78	
	$10,925	4.78	
	$10,925	4.78	
	$10,925	5.46	
	$10,925	6.43	
	$10,925	9.21	
Imperial County	$913	29.2	
	$9,500	65.14	
Monterey Bay Unified	$4,401	1.268	
	$4,577	20.169	
Sacramento Metropolitan	$10,500	2.133	
	$10,500	10.254	
	$15,000	0.668	
	$17,000	13.92	
	$20,000	0.422	
	$20,000	0.788	
	$20,000	2.08	

TABLE 4 (cont.)
1999 California
NOx Emission Reduction Credit Transaction Costs
Reported in Total Tons

District	$/ton	Tons	Notes
San Diego County	$19,000	23.1	
	$20,000	5.79	
	$21,000	1.21	
	$21,403	1.21	
	$24,151	2.5	
	$30,000	8	
	$32,000	3.3	
	$45,000	4.4	
San Joaquin Valley	$7,000	9.6	
	$7,960	8.6	
	$8,500	4.1	
	$8,500	9.6	
	$8,500	12	
	$10,000	83.6	
	$11,500	5.8	
	$11,500	7.4	
	$11,500	35	
	$12,000	4.5	
	$16,609	38.1	
Santa Barbara County	$5,000	4	
	$5,000	12	
South Coast	$22,222	4.5	
	$27,302	2.16	
	$27,778	1.62	
	$33,333	0.18	
	$33,333	0.36	
	$40,000	0.36	
Yolo-Solano	$8,000	51.55	

TABLE 5

1999 Summary Statistics For a Total of 64 NOx Transactions*

	$/ton	Tons
Total		1104.526
Average (mean)	$13,884	
Median	$10,925	
High	$45,000	
Low	$913	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 1

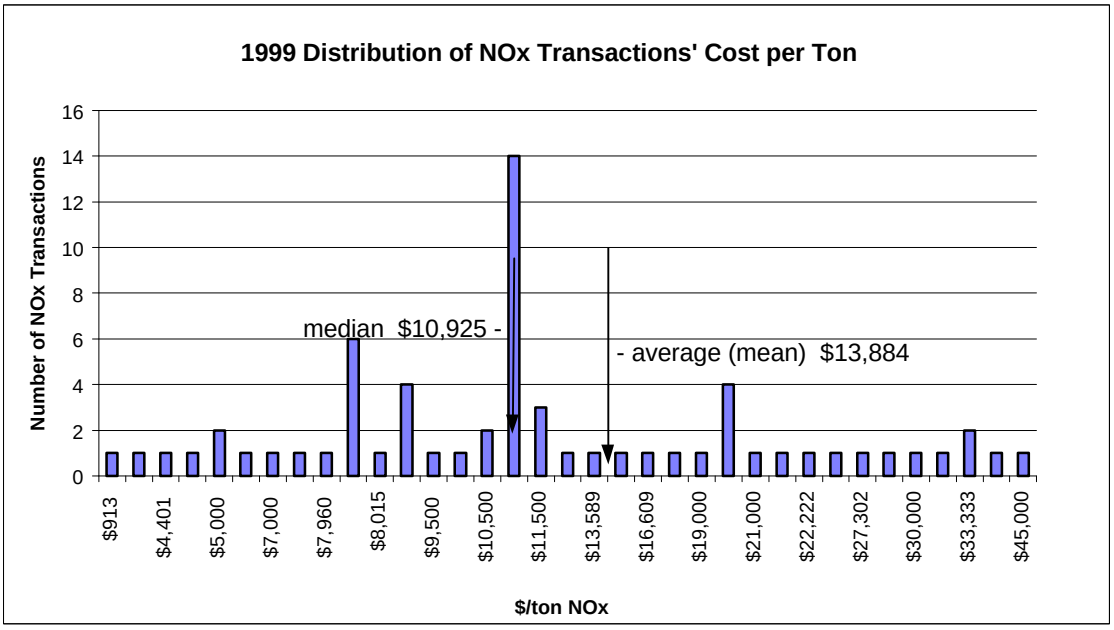


TABLE 6

1999 California

HC Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$3,602	43.819	
	$5,000	18.517	
	$5,714	1.1	
	$6,325	144	
	$8,015	40.97	
	$8,333	19.2	
Feather River	$5,463	0.9	
	$5,463	1.6	
	$5,463	2.2	
	$5,463	2.5	
	$5,463	3	
	$5,463	4.1	
	$5,463	5.7	
	$5,463	5.7	
	$5,463	5.7	
	$5,463	5.7	
	$5,463	5.7	
	$5,463	7.6	
	$5,463	8.3	
	$5,463	11	
	$8,000	0.1	
	$8,000	0.1	
	$8,000	0.1	
	$8,000	0.52	
	$8,000	5	
	$8,500	20.6	
Imperial County	$913	1.38	
Kern County	$3,600	12.48	
	$3,600	17.42	
	$3,600	20.62	
	$3,600	24.52	
	$3,600	74.96	
Monterey Bay Unified	$1,500	18	
	$4,401	0.283	
	$4,577	187.65	
Sacramento Metropolitan	$18,000	0.126	
	$18,000	1.233	
	$18,000	1.753	
	$20,000	0.083	

TABLE 6 (cont.)
1999 California
HC Emission Reduction Credit Transaction Costs
Reported in Total Tons

District	$/ton	Tons	Notes
San Diego County	$1,000	15.2	
	$1,344	1.86	
	$1,602	1	
	$6,537	5	
	$11,000	1.48	
	$12,500	2.1	
	$12,838	1.48	
	$13,790	5.3	
	$16,250	2.4	
	$28,000	17.05	
	$28,334	17.05	
San Joaquin Valley	$4,000	16.4	
	$6,100	1.1	
	$6,100	20.2	
	$6,500	13	
	$6,600	2.1	
	$7,960	61	
Santa Barbara County	$5,000	11	
	$7,500	1	
	$7,500	3.2	
	$10,000	1	
	$18,500	3.2	
	$19,425	3.2	
South Coast	$3,056	3.6	
	$3,333	1.44	
	$3,333	1.8	
	$3,333	1.8	
	$3,333	6.66	
	$3,333	36.18	
	$3,433	8.28	
	$3,472	8.28	
	$3,556	7.56	
	$3,567	10.8	
	$3,750	2.34	
	$3,787	68.4	
	$3,833	0.9	
	$3,861	21.78	
	$3,867	4.5	
	$3,889	0.18	
	$3,889	0.54	
	$3,889	0.9	

TABLE 6 (cont.)
1999 California
HC Emission Reduction Credit Transaction Costs
Reported in Total Tons

District	$/ton	Tons	Notes
South Coast (continued)	$3,889	1.26	
	$3,889	1.44	
	$3,889	1.62	
	$3,889	1.8	
	$3,889	1.8	
	$3,889	1.8	
	$3,889	2.34	
	$3,889	6.48	
	$3,889	9.72	
	$3,889	15.84	
	$3,889	20.7	
	$3,889	21.96	
	$3,889	37.26	
	$3,889	40.5	
	$3,903	12.6	
	$4,306	2.16	
	$4,306	6.48	
	$4,861	3.6	
	$5,556	8.28	
	$6,944	16.2	
Ventura County	$2,591	4.4	1-Year Lease
	$10,000	5.5	
	$15,000	3	
Yolo-Solano	$4,000	12.2	

TABLE 7

1999 'Summary Statistics For a Total of 103 HC Transactions*

	$/ton	Tons
Total		1,355.434
Average (mean)	$6,579	
Median	$4,931	
High	$28,334	
Low	$913	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 2

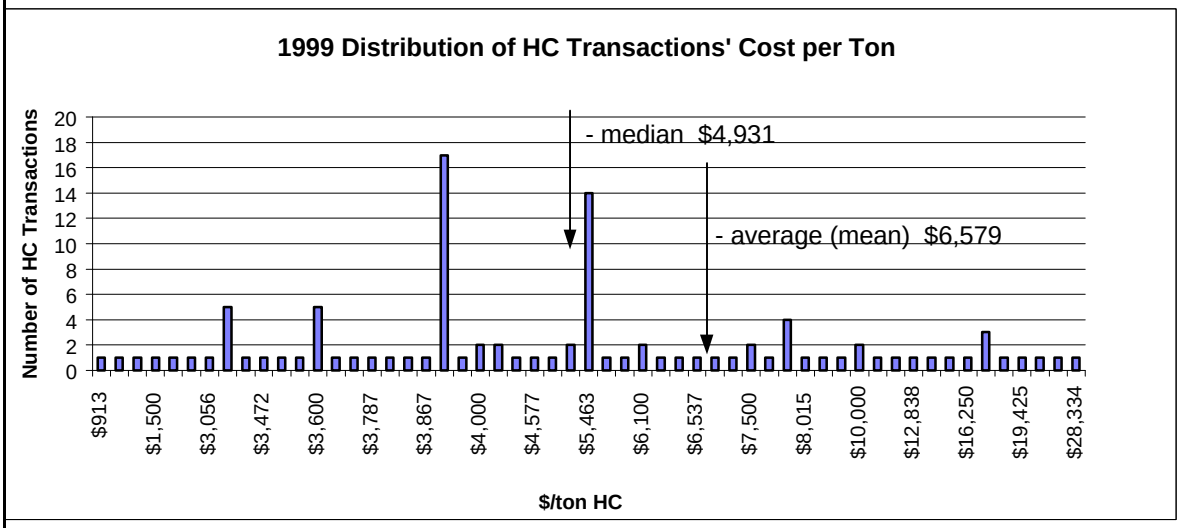


TABLE 8

1999 California

PM10 Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$7,844	98.13	
	$9,500	21.72	
Feather River	$8,500	28.12	
	$9,200	0.96	
	$9,200	1.8	
	$9,200	2.86	
	$9,200	2.94	
	$9,200	3.4	
	$9,200	4.66	
	$9,200	6.4	
	$9,200	6.4	
	$9,200	6.4	
	$9,200	6.4	
	$9,200	6.4	
	$9,200	9.31	
	$9,200	9.92	
	$9,200	12.34	
Imperial County	$500	1	
	$913	0.79	
	$1,000	1	
Monterey Bay Unified	$4,401	0.455	
San Joaquin Valley	$7,000	0.7	
	$7,500	25	
	$7,960	84.6	
	$16,800	16.5	
Santa Barbara County	$5,000	0.5	
South Coast	$11,111	0.18	
	$11,111	0.36	
	$11,111	0.54	
	$11,111	1.08	
	$11,111	1.62	
	$11,111	1.8	
	$11,111	4.5	
	$11,111	5.76	
	$11,111	18	
	$11,111	29.7	

TABLE 8 (cont.)

1999 California

PM10 Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
South Coast (continued)	$12,778	1.08	
	$12,778	1.44	
	$12,778	2.52	
	$12,778	47.16	
	$12,939	17.28	
	$13,333	0.36	
	$13,800	1.26	
	$13,889	0.36	
	$13,889	0.54	
	$13,889	1.08	
	$13,889	10.8	
	$14,055	2.34	
	$14,375	0.72	
	$14,375	2.16	
	$15,000	0.18	
	$16,111	2.52	
	$16,111	3.96	
Yolo-Solano	$8,000	19	

TABLE 9

1999 Summary Statistics For a Total of 57 PM10 Transactions*

	$/ton	Tons
Total		537.005
Average (mean)	$10,400	
Median	$11,111	
High	$16,800	
Low	$500	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 3

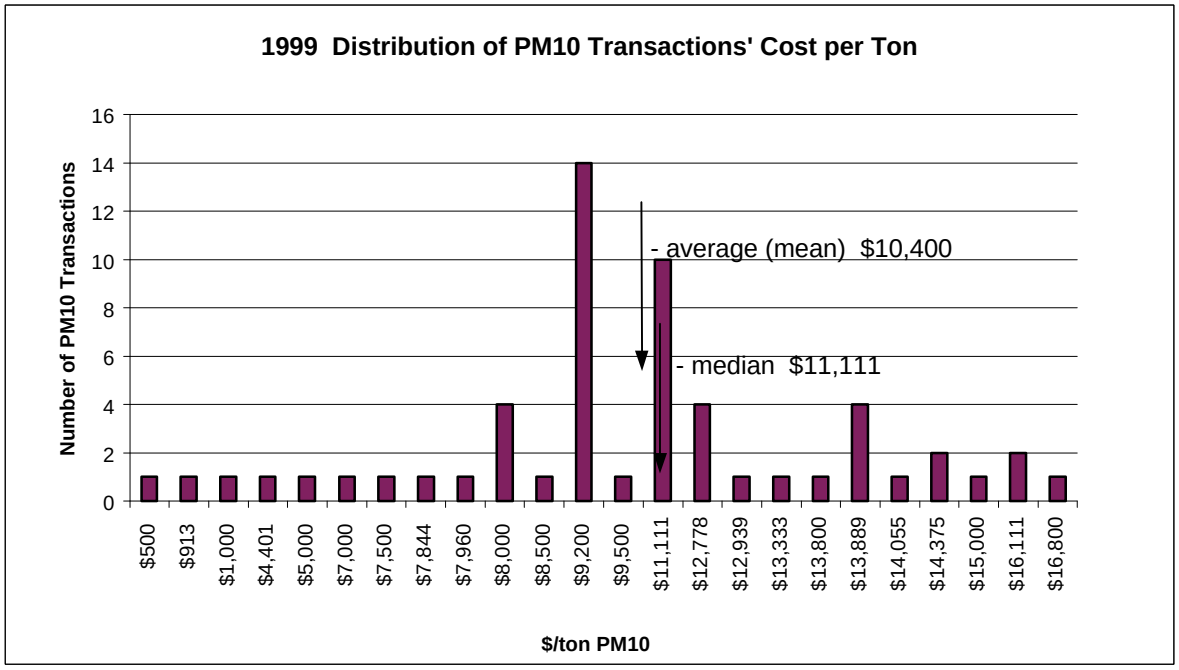


TABLE 10

1999 California

CO Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$5,714	2.4	
	$8,015	0.357	
Imperial County	$913	2.39	
Monterey Bay Unified	$4,401	0.257	
	$4,577	2.412	
San Joaquin Valley	$300	5.8	
	$300	31.4	
South Coast	$278	0.54	
	$278	3.06	
	$2,583	8.82	
	$2,583	8.82	
	$2,583	19.26	
	$3,194	1.62	
	$3,333	0.36	
	$3,333	0.54	
	$3,333	1.44	
	$3,333	2.34	
	$3,333	2.52	
	$3,333	2.88	
	$3,333	4.68	
	$3,333	10.08	
	$3,333	61.2	
	$3,333	120.78	
	$3,750	12.06	

TABLE 11

1999 Summary Statistics For a Total of 24 CO Transactions*

	$/ton	Tons
Total		306.016
Average (mean)	$3,033	
Median	$3,333	
High	$8,015	
Low	$278	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 4

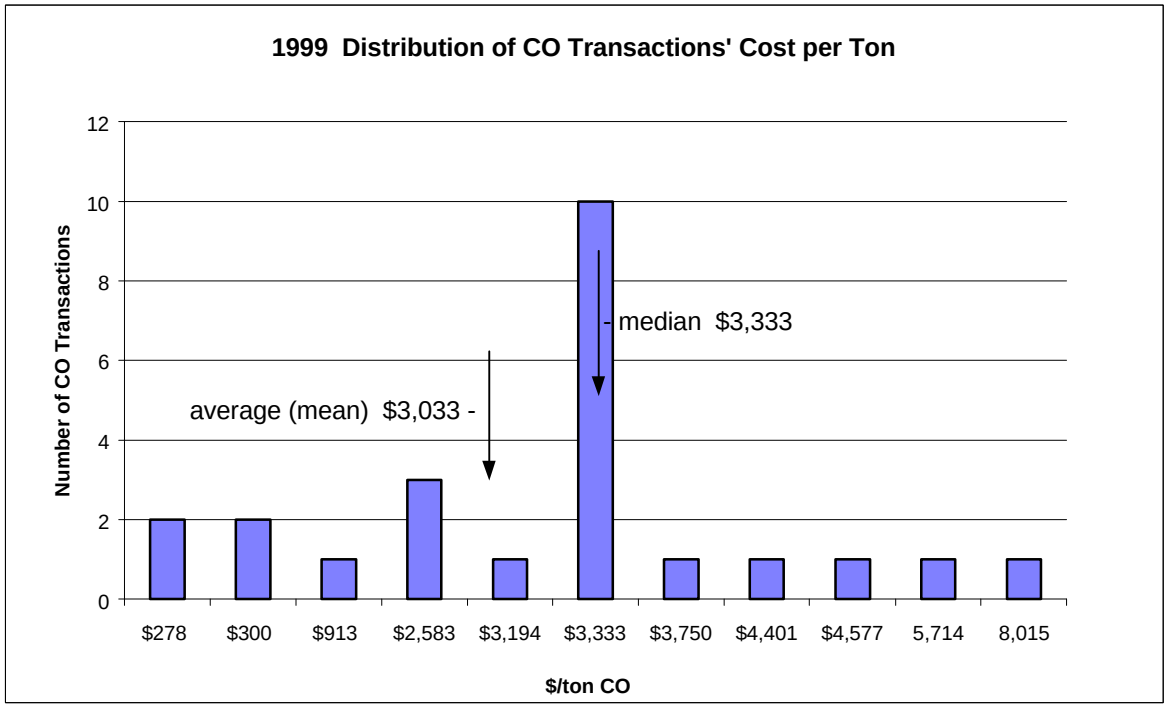


TABLE 12

1999 California
SOx Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$2,000	1.3	
	$2,000	71.59	
	$5,714	0.2	
	$6,325	46.3	
Imperial County	913	0.51	
Monterey Bay Unified	$4,401	0.009	
	$4,577	2.556	
San Joaquin Valley	$5,200	55	
Santa Barbara County	$5,000	11	
	$7,000	2	
South Coast	$6,042	1.52	
	$9,200	8.46	

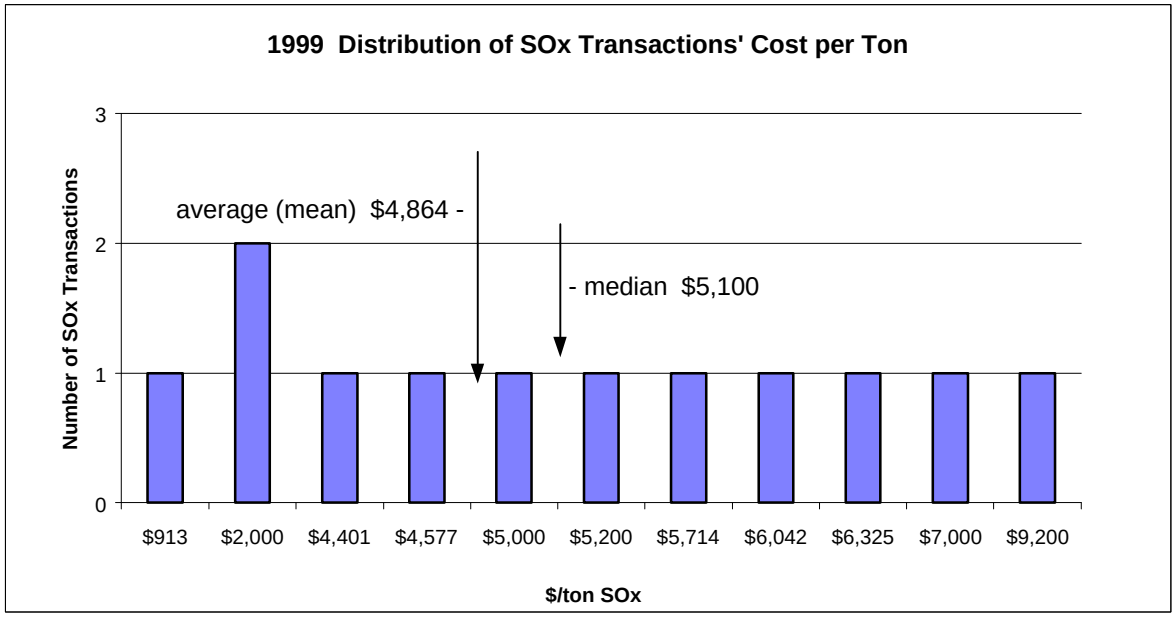
TABLE 13

1999 Summary Statistics For a Total of 12 SOx Transactions*

	$/ton	Tons
Total		200.445
Average (mean)	$4,864	
Median	$5,100	
High	$9,200	
Low	$913	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 5



SEVEN YEAR OFFSET TRANSACTION TRENDS

This is the seventh year (1993-1999) we have collected data statewide about the cost of offset transactions. Based upon this seven year period we see trends such as the number of transactions increasing from 30 to 260 and the number of districts reporting transactions increasing. The following summary charts illustrate these trends. For purposes of comparison, the 1998, 1997, 1996, 1995, 1994 and 1993 emission reduction credits transactions are included in Appendices A, B, C, D, E, and F respectively.

Summary Chart A illustrates that the average cost per ton of NOx decreased from 1993 through 1996, however, starting in 1997 the price of NOx slowly increased in the past two years (1998 and 1999).

Summary Chart B illustrates that the average cost per ton of HC decreased in price till 1995, but since then the cost per ton of HC fluctuated up and down, but has remained lower in cost compared to 1993 through 1995.

Summary Chart C illustrates that the average cost per ton for PM10 gradually fell from 1993 through 1995, and has remained fairly close in price from 1995 through 1999, with the exception of 1998 which shot up but then came back down the following year.

Summary Chart D illustrates that the number of transactions since 1993 have increased steadily for NOx and PM10, however, HC transactions have increased more dramatically.

Summary Chart E illustrates that the number of tons traded of NOx, HC and PM10, have also increased steadily since 1993, with HC showing the most tonnage traded.

Summary Chart F illustrates that along with an increase in the number of ERC transactions in the past seven years, there is also an increase in the number of pollutants being traded.

Summary Chart G illustrates that along with an increase in the number of ERC transactions in the past seven years, there is also an increase in the number of tons traded per pollutant.

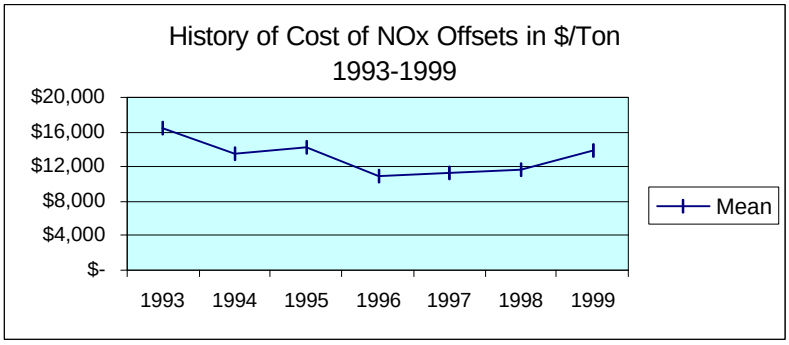
Summary Chart H illustrates that the number of offset transactions per district has increased since the inception of this report in 1993.

Summary Chart I illustrates that the average cost per ton of NOx offsets by district decreased between 1993 through 1996, but have slowly risen since then.

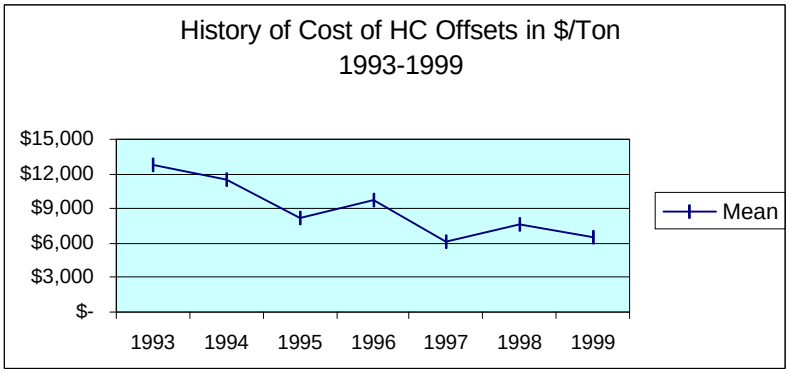
Summary Chart J illustrates that the average cost per ton of HC offsets by district has risen in the past two years.

Summary Chart K illustrates that the average cost per ton of PM10 by district has decreased in price significantly since 1993-1995.

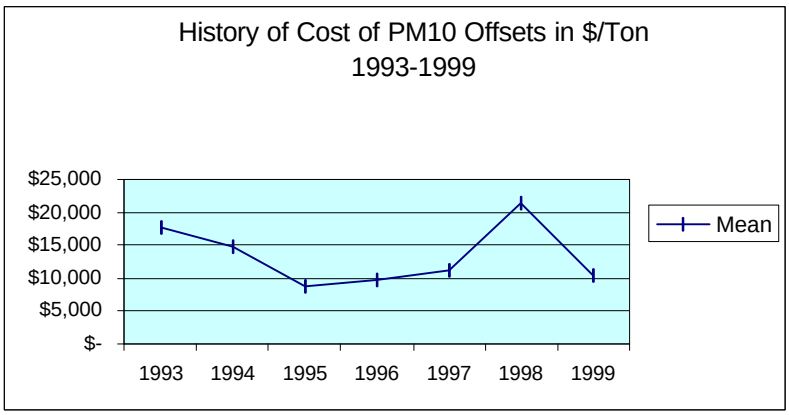
Summary Chart A



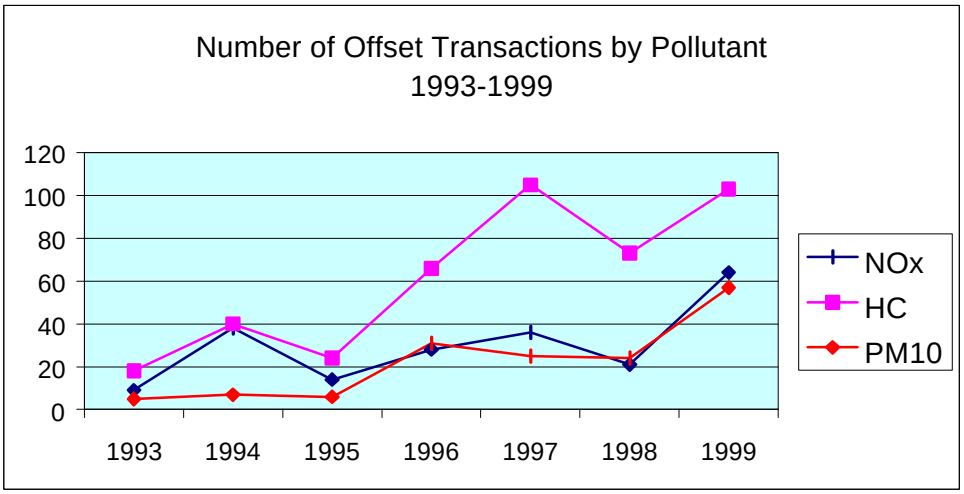
Summary Chart B



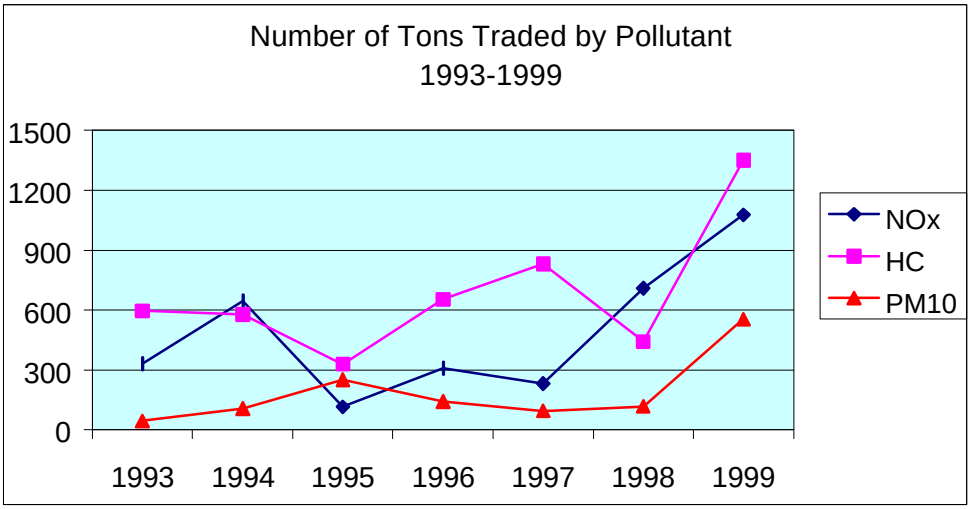
Summary Chart C



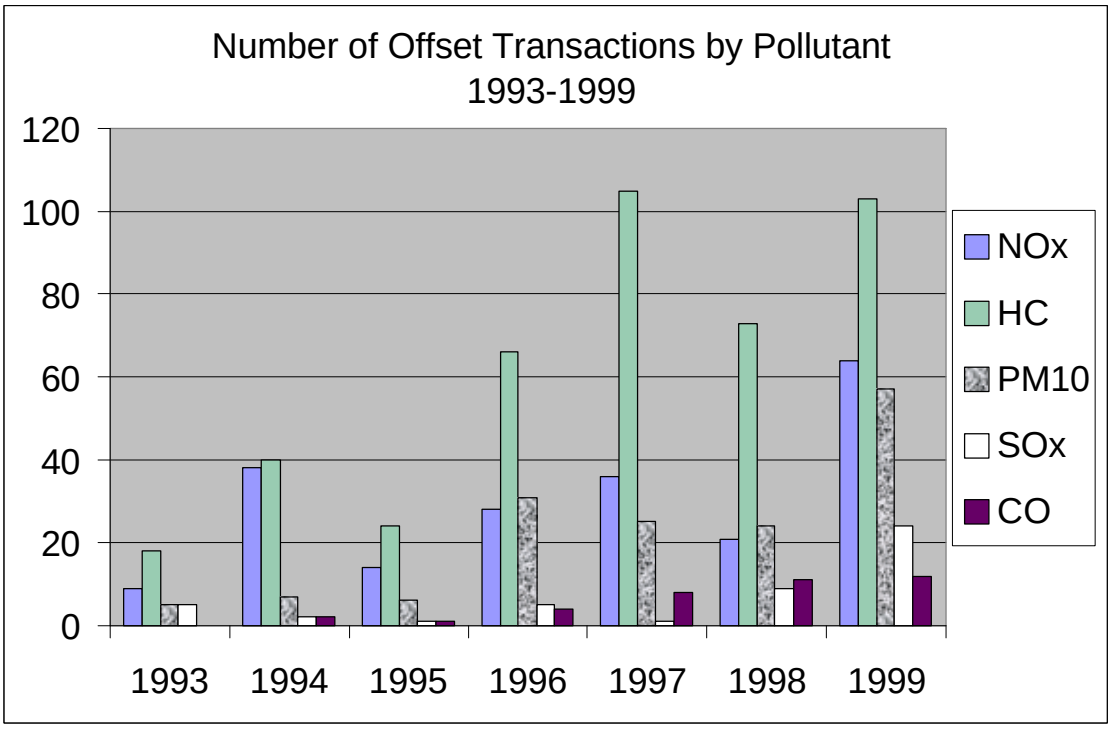
Summary Chart D



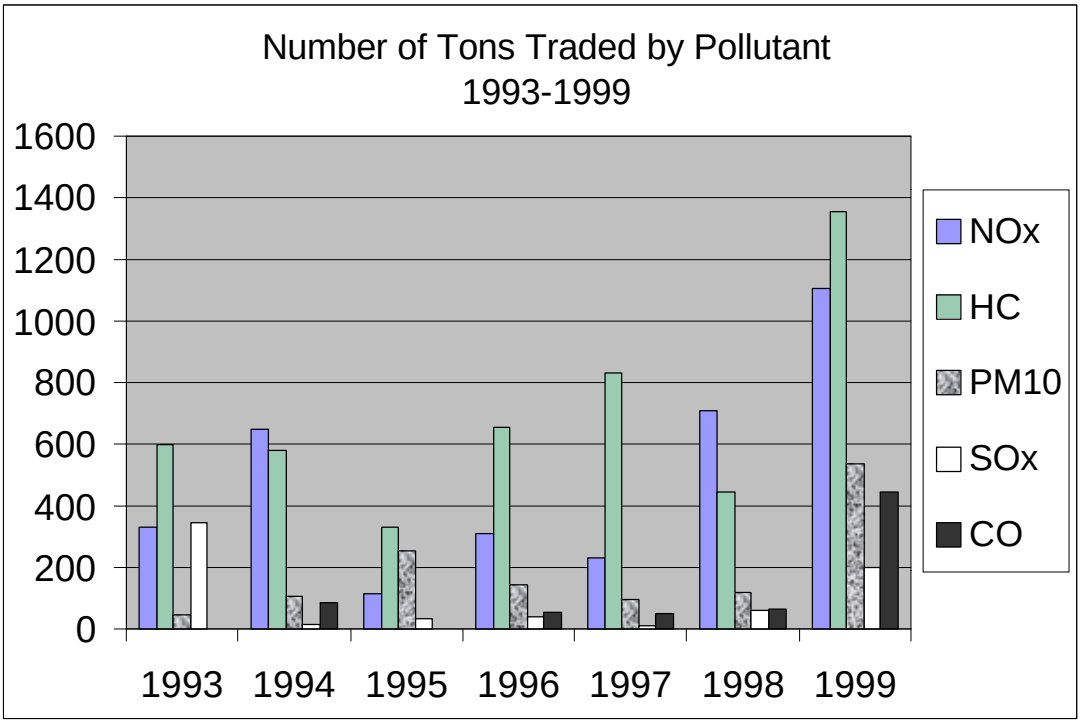
Summary Chart E



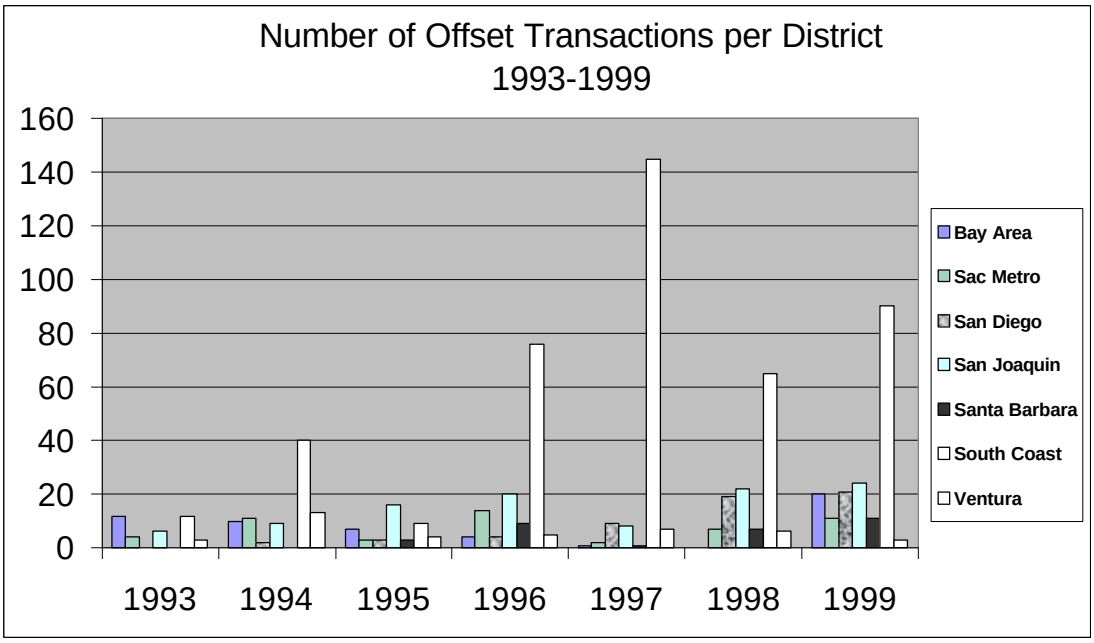
Summary Chart F



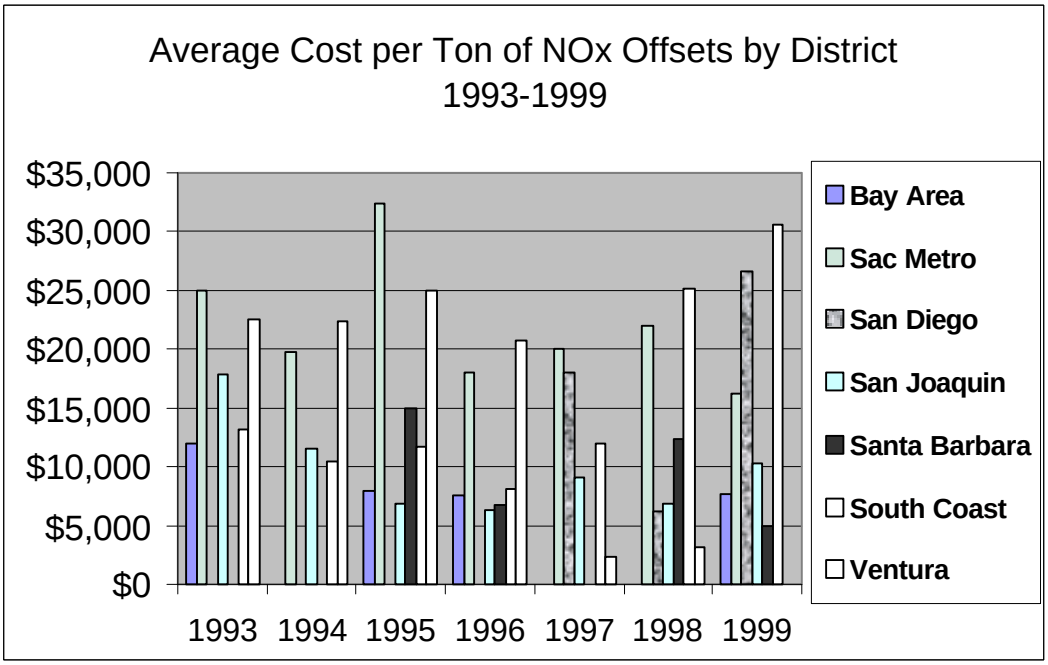
Summary Chart G



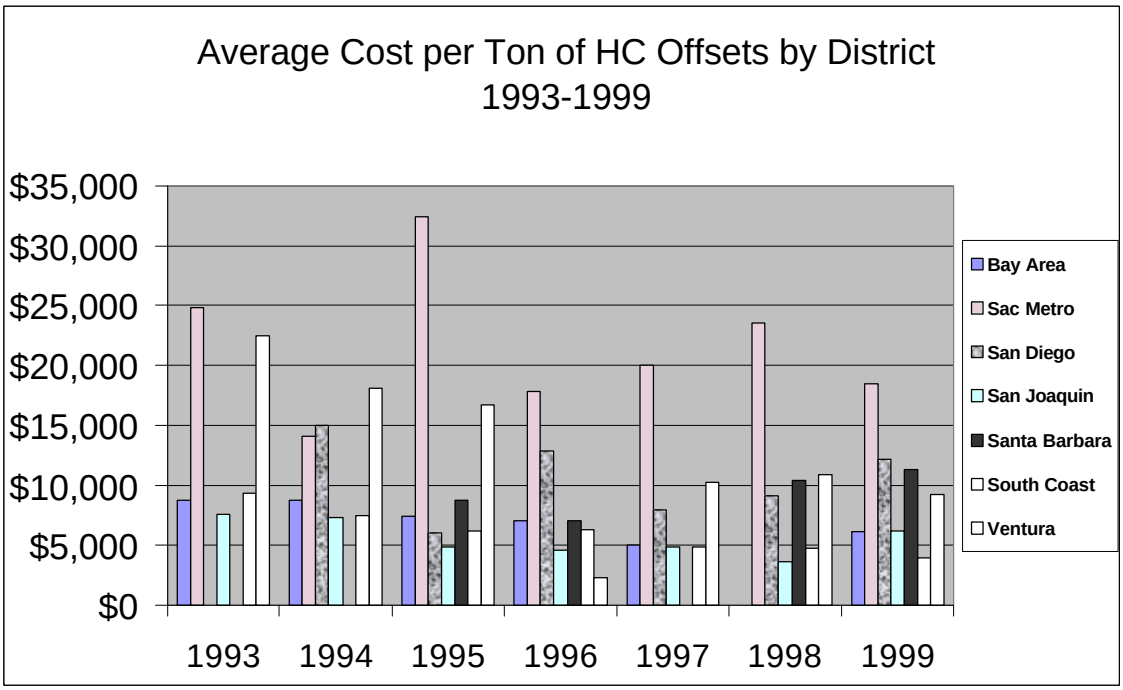
Summary Chart H



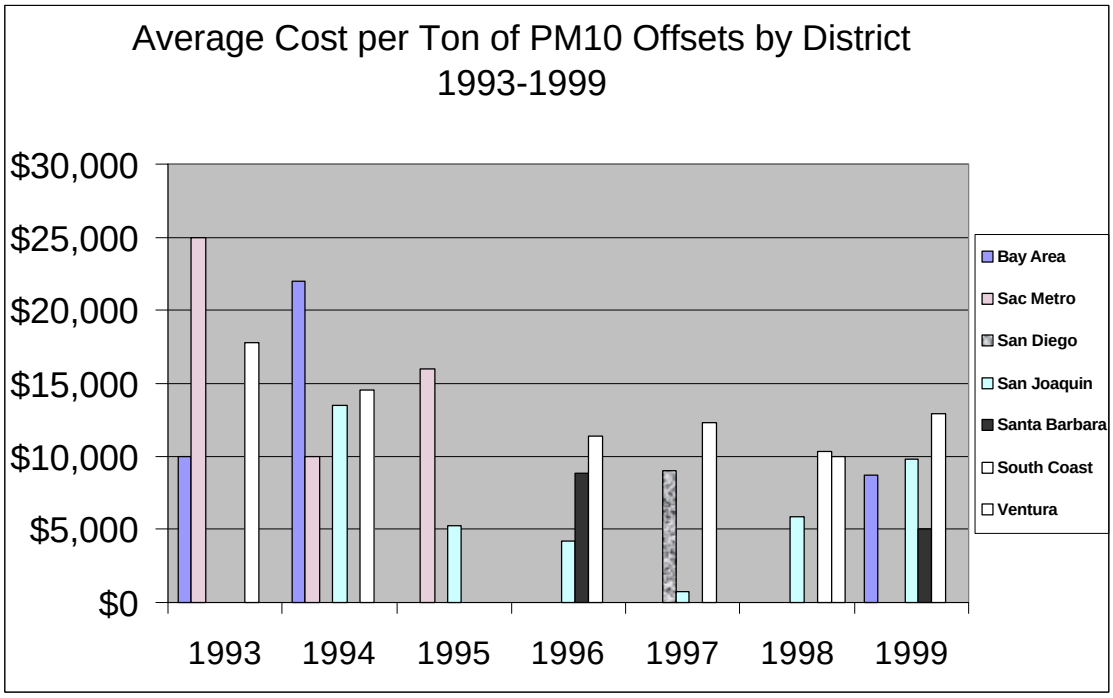
Summary Chart I



Summary Chart J



Summary Chart K



APPENDIX A: 1998 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF 1998 DATA

Table 2 presents all of the transactions which took place in the State, listed by individual districts. There were a total of 141 transactions statewide in 1998. The majority of transactions involved emission reductions from stationary sources, however nine transactions were from discontinued agricultural burning and two were from mobile source emission reductions. There were three transactions in which no costs are reported; two involved barter and one involved subsidiary transfer. In addition, the South Coast reported nine purchases which are not shown in this report. These were credits purchased by offset brokers for later re-sale. They are not shown in Table 2 because they do not represent the final cost paid by the end-user of the offsets. Only credits sold to an end-user are reflected in the data presented. Of the remaining 138 transactions, excluding all that were non-monetary, barter or subsidiary transactions, 21 were NOx transactions, 73 were HC transactions, 24 were PM10 transactions, 9 were CO transactions, and 11 were SOx transactions. All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1998.

Table 4 and Table 6 present information by district for NOx and HC, respectively. Table 8 presents information by district for PM10, CO and SOx. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Barter and subsidiary transactions that do not have an associated cost are listed at the beginning of each district's transactions.

Table 5, Table 7, Table 9, and Table 10 summarize the data of each preceding table. The summary tables include the average or mean, the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude asset transfer, subsidiary, barter, and other non-monetary transactions where there were no associated costs to include in the calculations.

As shown in Table 5, the median price per ton of NOx was $10,925 and the average price was $11,750; the high price per ton of NOx was $28,356 and the low was $913. As shown in Table 7, the median price per ton of HC was $4,932 and the average price was $7,680. The high price per ton of HC was $30,000, and the low was $165. Table 8 includes the cost of PM10, CO, and SOx transactions. As shown in Table 9, with 24 PM10 transactions, the median and average price per ton were $10,000 and $9,475 respectively, the high price per ton of PM10 was $21,429 and the low was $50. As shown in Table 10, with 11 SOx transactions, the median and average price per ton were $10,411 and $7,927 respectively, the high price per ton of SOx was $10,411 and the low was $913. As shown in Table 11, with 9 CO transactions, the median and average price per ton were $2,509 and $4,434 respectively, the high price per ton of CO was $21,429 and the low was $165.

Chart 1, Chart 2, Chart 3, Chart 4, and Chart 5 are bar graphs that show the number of transactions per cost of a pollutant per ton. These Charts also show the median and average (mean) price paid per ton of pollutant in Tables 4, 6, 8, 10, and 11 respectively.

1998 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Imperial County	NOx	$913	92.97	
Total of 13 Transactions	HC	$165	2.42	Agricultural Transaction
	HC	$913	4.77	
	HC	$21,429	0.019	Agricultural Transaction
	PM10		1.0	Agricultural Barter Transaction
	PM10	$50	1.0	Agricultural Transaction
	PM10	$165	3.45	Agricultural Transaction
	PM10	$913	2.79	
	PM10	$21,429	0.017	Agricultural Transaction
	CO	$165	28.98	Agricultural Transaction
	CO	$913	6.84	
	CO	$21,429	0.102	Agricultural Transaction
	SOx	$913	2.16	
Mojave Desert	PM10	$10,000	0.1	
Total of 1 Transaction				
Sacramento Metropolitan	NOx	$18,000	0.75	
Total of 7 Transactions	NOx	$26,000	0.12	
	HC	$18,000	0.12	
	HC	$20,000	0.458	
	HC	$20,000	0.75	
	HC	$30,000	0.135	
	HC	$30,000	0.156	
San Diego County	NOx	$1,972	21.9	1-Year Lease
Total of 19 Transactions	NOx	$2,415	5.3	1-Year Lease
	NOx	$2,419	15.5	1-Year Lease
	NOx	$18,000	6.23	
	HC		9.09	Subsidiary Transaction
	HC	$493	15.2	1-Year Lease
	HC	$1,125	7.86	1-Year Lease
	HC	$1,972	42	1-Year Lease
	HC	$7,500	7.4	
	HC	$11,500	3.15	
	HC	$11,948	7.4	
	HC	$11,948	7.4	
	HC	$11,948	18.2	
	HC	$11,948	18.2	
	HC	$13,250	18.14	
	HC	$14,974	3.15	
	HC	$14,986	3.15	
	HC	$17,000	1	
	CO	$1,624	2	

1998 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
San Joaquin Valley Unified	NOx	$1,005	10.54	
Total of 22 Transactions	NOx	$4,000	0.128	
	NOx	$6,245	7.75	
	NOx	$11,500	520	
	NOx	$11,574	1.3	
	HC	$2,000	7.5	
	HC	$2,950	14.07	
	HC	$3,112	0.34	
	HC	$4,000	0.0065	
	HC	$6,100	60	
	PM10	$3,990	17.1	
	PM10	$4,000	5.8	
	PM10	$4,000	17.1	
	PM10	$4,279	0.71	
	PM10	$4,400	0.5	
	PM10	$10,000	0.864	
	PM10	$10,400	50	
	CO	$2,509	0.93	
	CO	$4,000	0.027	
	SOx	$4,000	0.001	
	SOx	$4,509	0.66	
	SOx	$5,200	17	
Santa Barbara County	NOx	$5,952	0.72	5-YR Mobile Transaction
Total of 7 Transactions	NOx	$18,750	0.16	
	HC	$4,200	0.76	
	HC	$4,400	0.72	
	HC	$5,952	0.12	5-YR Mobile Transaction
	HC	$18,750	0.03	
	HC	$18,883	0.72	
South Coast	NOX	$17,534	7.85	
Total of 65 Transactions	NOx	$27,397	0.18	
	NOx	$27,397	0.73	
	NOx	$28,356	3.29	
	HC		6.39	Barter Transaction
	HC	$3,836	1.46	Retired
	HC	$4,932	1.46	Retired
	HC	$4,932	3.29	Retired
	HC	$1,096	36.5	
	HC	$2,139	2.56	
	HC	$3,288	1.46	
	HC	$3,288	7.3	
	HC	$3,288	7.3	
	HC	$3,836	0.73	
	HC	$3,836	1.83	

1998 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	HC	$3,836	2.92	
	HC	$4,007	11.86	
	HC	$4,110	6.39	
	HC	$4,274	2.74	
	HC	$4,274	4.75	
	HC	$4,384	0.18	
	HC	$4,384	0.18	
	HC	$4,384	0.37	
	HC	$4,384	8.58	
	HC	$4,384	16.06	
	HC	$4,453	2.92	
	HC	$4,453	6.39	
	HC	$4,453	21.17	
	HC	$4,658	0.37	
	HC	$4,658	0.55	
	HC	$4,932	0.91	
	HC	$4,932	6.02	
	HC	$4,932	6.57	
	HC	$5,156	0.37	
	HC	$5,220	0.91	
	HC	$5,220	1.83	
	HC	$5,220	7.3	
	HC	$5,222	0.18	
	HC	$5,479	0.37	
	HC	$5,479	6.02	
	HC	$6,575	1.1	
	HC	$6,575	3.47	
	HC	$6,849	2.19	
	HC	$15,342	0.73	
	PM10	$9,863	0.37	
	PM10	$9,863	0.55	
	PM10	$9,863	1.83	
	PM10	$10,958	0.91	
	PM10	$10,958	1.64	
	PM10	$13,151	1.64	
	PM10	$13,699	0.37	
	PM10	$14,795	2.01	
	PM10	$15,562	4.02	
	PM10	$17,534	0.18	
	PM10	$17,534	4.2	
	CO	$2,139	9.13	
	CO	$3,288	10.77	
	CO	$3,836	1.83	
	SOX	$10,108	8.58	
	SOx	$10,411	2.37	

1998 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	SOx	$10,411	2.56	
	SOx	$10,411	3.1	
	SOx	$10,411	3.47	
	SOx	$10,411	10.95	
	SOx	$10,411	13.69	
Ventura County Total of 6 Transactions	NOx	$2,000	2.0	One Year Lease
	NOx	$4,400	2.0	Two Year Lease
	HC	$10,000	2.0	
	HC	$10,000	5.4	
	HC	$12,500	3.0	
	PM10	$10,000	1.1	
Yolo-Solano Total of 1 Transaction	NOx	$10,925	9.14	2nd Through 4th Qtrs - No Length

~~Districts With No Offset Transactions to Report in 1998~~

Amador County Air Pollution Control District
Antelope Valley Air Pollution Control District
Bay Area Air Quality Management District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District
Feather River Air Quality Management District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Kern County Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Monterey Bay Unified Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
Placer County Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Shasta County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District

1998 California

NOx Emission Reduction Credit Transaction Costs

Reported in Total Tons

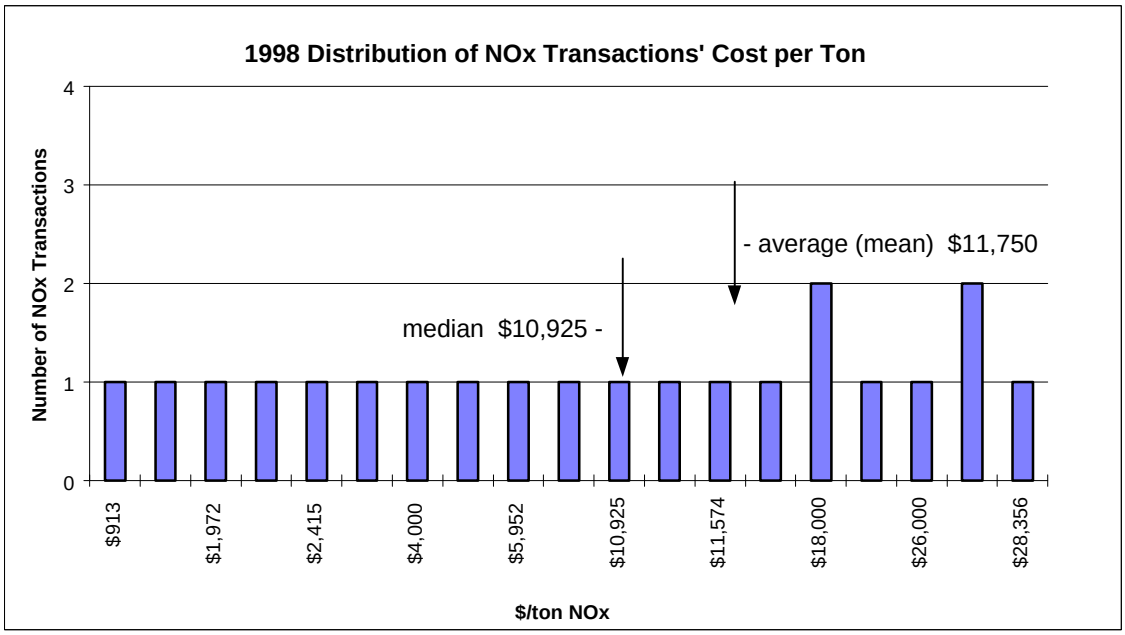
District	$/ton	Tons	Notes
Imperial County	$913	92.97	
Sacramento Metropolitan	$18,000	0.75	
	$26,000	0.12	
San Diego County	$1,972	21.9	1-Year Lease
	$2,415	5.3	1-Year Lease
	$2,419	15.5	1-Year Lease
	$18,000	6.23	
San Joaquin Valley Unified	$1,005	10.54	
	$4,000	0.128	
	$6,245	7.75	
	$11,500	520	
	$11,574	1.3	
Santa Barbara County	$5,952	0.72	5-YR Mobile Transaction
	$18,750	0.16	
South Coast	$17,534	7.85	
	$27,397	0.18	
	$27,397	0.73	
	$28,356	3.29	
Ventura County	$2,000	2.0	One Year Lease
	$4,400	2	Two Year Lease
Yolo-Solano	$10,925	9.14	Valid 2nd Through 4th Qtrs

TABLE 5

1998 Summary Statistics For a Total of 21 NOx Transactions*

	$/ton	Tons
Total		708.558
Average (mean)	$11,750	
Median	$10,925	
High	$28,356	
Low	$913	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.



1998 California

HC Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Imperial	$165	2.42	Agricultural Transaction
	$913	4.77	
	$21,429	0.019	Agricultural Transaction
Sacramento Metropolitan	$18,000	0.12	
	$20,000	0.458	
	$20,000	0.75	
	$30,000	0.135	
	$30,000	0.156	
San Diego County	$493	15.2	1-Year Lease
	$1,125	7.86	1-Year Lease
	$1,972	42	1-Year Lease
	$7,500	7.4	
	$11,500	3.15	
	$11,948	7.4	
	$11,948	7.4	
	$11,948	18.2	
	$11,948	18.2	
	$13,250	18.14	
	$14,974	3.15	
	$14,986	3.15	
	$17,000	1	
San Joaquin Valley	$2,000	7.5	
	$2,950	14.07	
	$3,112	0.34	
	$4,000	0.0065	
	$6,100	60	
Santa Barbara County	$4,200	0.76	
	$4,400	0.72	
	$5,952	0.12	5-YR Mobile Transaction
	$18,750	0.03	
	$18,883	0.72	
South Coast	$3,836	1.46	Retired
	$4,932	1.46	Retired
	$4,932	3.29	Retired
	$1,096	36.5	
	$2,139	2.56	
	$3,288	1.46	
	$3,288	7.3	
	$3,288	7.3	

1998 California

HC Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
South Coast (continued)	$3,836	0.73	
	$3,836	1.83	
	$3,836	2.92	
	$4,007	11.86	
	$4,110	6.39	
	$4,274	2.74	
	$4,274	4.75	
	$4,384	0.18	
	$4,384	0.18	
	$4,384	0.37	
	$4,384	8.58	
	$4,384	16.06	
	$4,453	2.92	
	$4,453	6.39	
	$4,453	21.17	
	$4,658	0.37	
	$4,658	0.55	
	$4,932	0.91	
	$4,932	6.02	
	$4,932	6.57	
	$5,156	0.37	
	$5,220	0.91	
	$5,220	1.83	
	$5,220	7.3	
	$5,222	0.18	
	$5,479	0.37	
	$5,479	6.02	
	$6,575	1.1	
	$6,575	3.47	
	$6,849	2.19	
	$15,342	0.73	
Ventura County	$10,000	2.0	
	$10,000	5.4	
	$12,500	3.0	

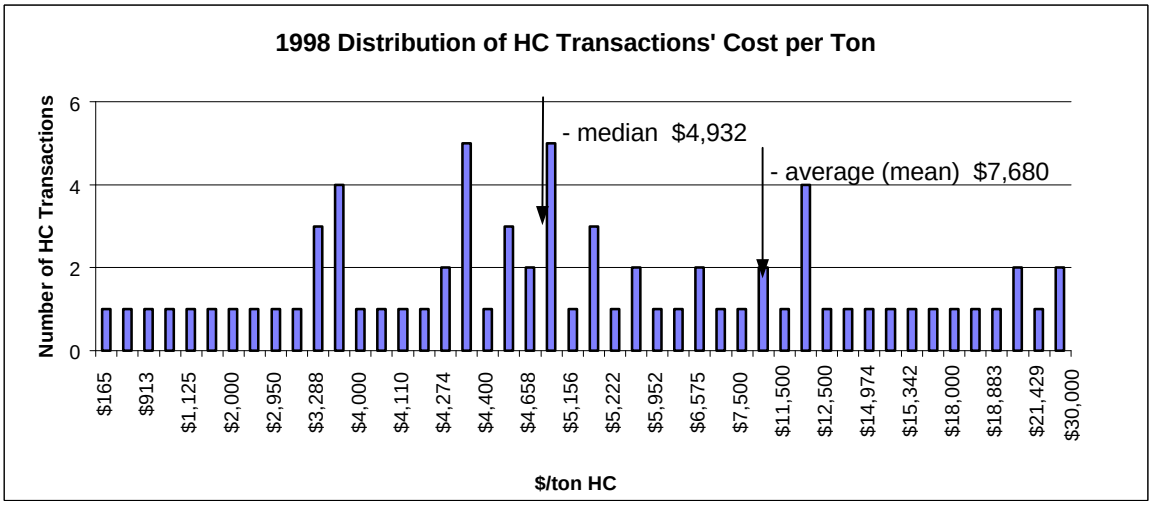
TABLE 7

1998 'Summary Statistics For a Total of 73 HC Transactions*

	$/ton	Tons
Total		443.0345
Average (mean)	$7,680	
Median	$4,932	
High	$30,000	
Low	$165	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 2



1998 California

PM10, CO, and SOx Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
PM10 Transactions			
Imperial County	$50	1	Agricultural Transaction
	$165	3.45	Agricultural Transaction
	$913	2.79	
	$21,429	0.017	Agricultural Transaction
Mojave Desert	$10,000	0.1	
San Joaquin Valley	$3,990	17.1	
	$4,000	5.8	
	$4,000	17.1	
	$4,279	0.71	
	$4,400	0.5	
	$10,000	0.864	
	$10,400	50	
South Coast	$9,863	0.37	
	$9,863	0.55	
	$9,863	1.83	
	$10,958	0.91	
	$10,958	1.64	
	$13,151	1.64	
	$13,699	0.37	
	$14,795	2.01	
	$15,562	4.02	
	$17,534	0.18	
	$17,534	4.2	
Ventura County	$10,000	1.1	
CO Transactions			
Imperial County	$165	28.98	Agricultural Transaction
	$913	6.84	
	$21,429	0.019	
San Diego County	$1,624	2.0	
San Joaquin Valley Unified	$2,509	0.93	
	$4,000	0.027	

1998 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	$/ton	Tons	Notes
CO Transactions			
South Coast	$2,139	9.13	
	$3,288	10.77	
	$3,836	1.83	
SOx			
Imperial County	913.0	2.16	
San Joaquin Valley Unified	$4,000	0.001	
	$4,509.0	0.66	
	$5,200.0	17	
South Coast	$10,108	8.58	
	10,411	2.37	
	10,411	2.56	
	10,411	3.1	
	10,411	3.47	
	10,411	10.95	
	$10,411	13.69	

TABLE 9

1998 Summary Statistics For a Total of 24 PM10 Transactions*

	$/ton	Tons
Total		118.251
High	$21,429	
Average (mean)	$9,475	
Median	$10,000	
Low	$50	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 3

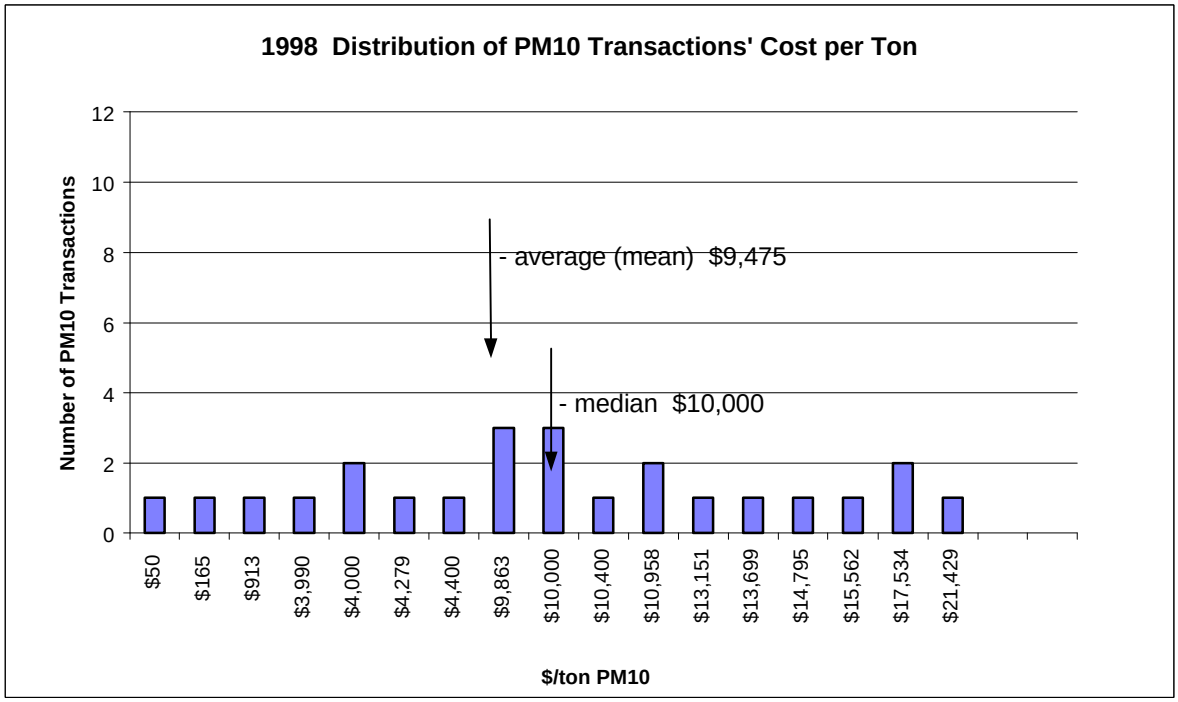


TABLE 10

1998 Summary Statistics For a Total of 11 SOx Transactions*

	$/ton	Tons
Total		64.541
High	$10,411	
Average (mean)	$7,927	
Median	$10,411	
Low	$913	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 4

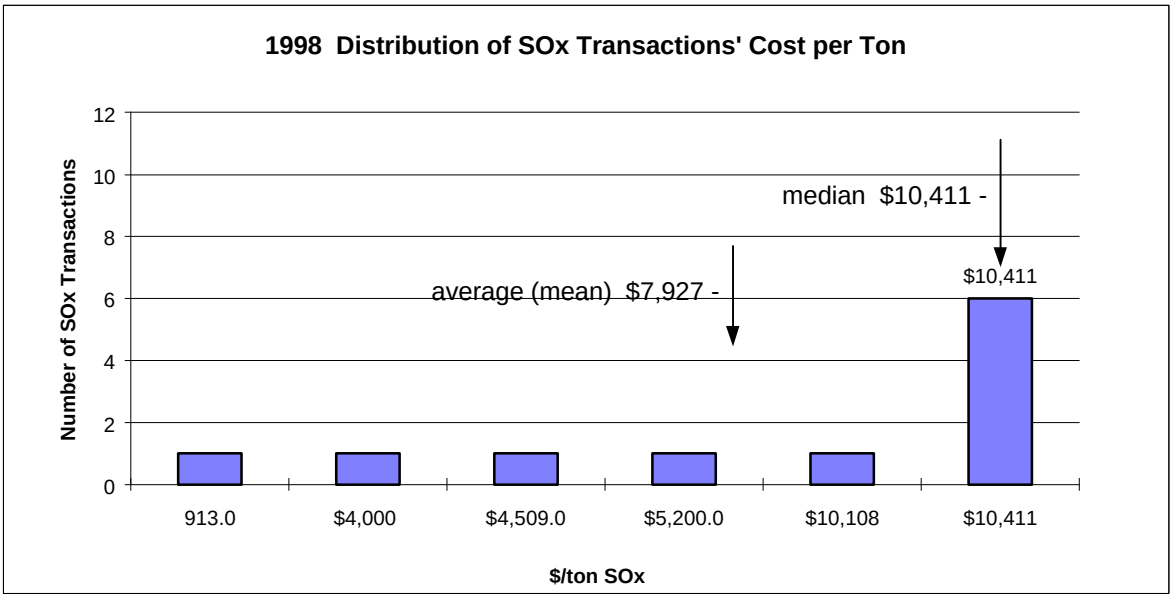


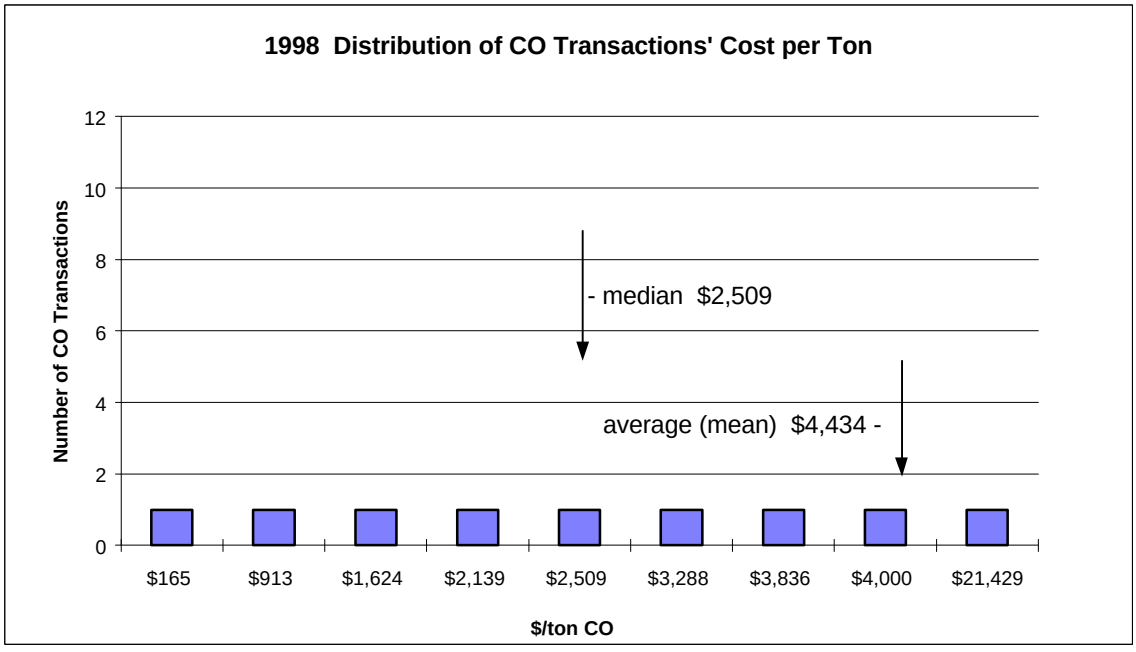
TABLE 11

1998 Summary Statistics For a Total of 9 CO Transactions*

	$/ton	Tons
Total		60.526
High	$21,429	
Average (mean)	$4,434	
Median	$2,509	
Low	$165	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 5



APPENDIX B: 1997 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF 1997 DATA

The emission reduction credits transactions reported by the districts are presented in Table 2. Table 4 and Table 6 present information by district for NOx and HC, respectively. Table 8 presents information by district for PM10, CO and SOx. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Barter and subsidiary transactions that do not have an associated cost are listed at the beginning of each district's transactions.

Table 5, Table 7, and Table 9 summarize the data of each preceding table. The summary tables include the average or mean, the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude asset transfer, subsidiary, barter, and other non-monetary transactions where there were no associated costs to include in the calculations.

Chart 1, Chart 2, and Chart 3 are histograms of Tables 4, 6, and 8 respectively. (A histogram gives the cumulative frequency of data points falling within a specified range. For example, in Table 8 there is one PM10 transaction between $0 and $2,499, no transactions between $2,500 and $4,999, no transactions between $5,000 and $7,499, eight transactions between $7,500 and $9,999, six transactions between $10,000 and $12,499, three transactions between $12,500 and $14,999, five transactions between $15,000 and $17,499, and no transactions between $17,500 and $25,000. These are reflected in Chart 3.)

Table 2 presents all of the transactions taking place within a district. There were a total of 175 transactions statewide in 1997. All but two of the transactions were from stationary source emission reductions; one transaction was an agricultural emission reduction source, and the other was a mobile source. One of the transactions included in this table involved a non-criteria pollutant (SO4), and, is provided for information only, and is not included in any of the charts.

Three of the transactions involved one subsidiary and two barter transactions; of these, there was one barter and one subsidiary transaction for which no costs were reported. There were eight CO transactions, three with cost information, and five without; and there was only one SOx transaction this year compared to five last year. The South Coast had 64 transactions that were non-monetary; 62 of the transactions were transfer of total assets with no cost established for emission reduction credits, and 2 of the transactions were intra-company transfer of emission reduction credits. Of the remaining transactions, excluding all those that were non-monetary, barter or subsidiary transactions, 31 transactions were NOx transactions, 51 were HC transactions, 23 were PM10 transactions, 3 were CO transactions, and 1 was a SOx transaction. All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1997.

As shown in Table 5, the median price per ton of NOx was $11,507 and the average price was

$11,257; the high price per ton of NOx was $20,000 and the low was $2,000. As shown in Table 7, the median price per ton of HC was $5,000 and the average price was $6,047. The high price per ton of HC was $25,000, and the low was $384. Table 8 includes the cost of PM10, CO, and SOx transactions. There were only three CO transactions and one SOx transaction. As shown in Table 9, with 23 PM10 transactions, the median and average price per ton were $10,959 and $11,571 respectively, the high price per ton of PM10 was $16,438 and the low was $400.

TABLE 2

1997 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
Bay Area	HC	$5,000	11.62	
Total of 1 Transaction				
Imperial County	HC	$2,000	3.45	
Total of 1 Transaction				
Sacramento Metropolitan	NOx	$20,000	1	
Total of 2 Transactions	HC	$20,000	0.2	
San Diego County	NOx	$18,000	21.9	
Total of 9 Transactions	HC	$667	17.35	1-Year Lease
	HC	$1,200	13.8	1-Year Lease
	HC	$9,000	48	
	HC	$9,865	48	
	HC	$11,000	13	
	HC	$11,000	46	
	HC	$13,169	46	
	PM10	$9,000	2	
San Joaquin Valley Unified	NOx	$6,625	6.42	Credits valid in 2nd and 3rd Quarters
Total of 8 Transactions	NOx	$11,562	5.35	
	HC	$4,875	3.56	
	PM10		3.6	Barter Transaction
	PM10	$10,579	0.4	
	CO	$6,703	6.595	Credits valid in 2nd and 3rd Quarters
	SOx	$5,200	10.92	
	SO4	$178	0.17	
San Luis Obispo County	NOx	$3,000	5.7	Barter Transaction
Total of 1 Transaction				
Santa Barbara County	HC		1.56	Subsidiary Transaction
Total of 1 Transaction				
Shasta County	PM10	$400	0.126	
Total of 1 Transaction				
South Coast	NOx		32.485	Intra-Company Transfer of ERCs
Total of 145 Transactions	NOx		8.395	Transfer of Total Assets; ERC Cost Not Est.
	NOx		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	NOx		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	NOx		12.775	Transfer of Total Assets; ERC Cost Not Est.
	NOx	$5,814	1.46	
	NOx	$8,219	9.6725	

TABLE 2 (cont.)

1997 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast	NOx	$10,959	0.5475	
(continued)	NOx	$10,959	1.46	
	NOx	$10,959	1.2775	
	NOx	$10,959	0.73	
	NOx	$11,096	1.825	
	NOx	$11,342	0.365	
	NOx	$11,342	10.4025	
	NOx	$11,414	2.19	
	NOx	$11,507	2.92	
	NOx	$11,507	3.8325	
	NOx	$11,507	0.5475	
	NOx	$11,781	0.1825	
	NOx	$11,781	1.825	
	NOx	$12,521	30.8425	
	NOx	$13,699	0.5475	
	NOx	$13,699	12.775	
	NOx	$13,699	8.395	
	NOx	$13,699	5.11	
	NOx	$13,699	11.4975	
	NOx	$13,699	5.2925	
	NOx	$14,247	2.19	
	NOx	$15,068	0.1825	
	HC		31.025	Intra-Company Transfer of ERCs
	HC		0.73	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.73	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.

TABLE 2 (cont.)

1997 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
(continued)	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.365	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.5475	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.73	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.73	Transfer of Total Assets; ERC Cost Not Est.
	HC		0.9125	Transfer of Total Assets; ERC Cost Not Est.
	HC		1.095	Transfer of Total Assets; ERC Cost Not Est.
	HC		1.2775	Transfer of Total Assets; ERC Cost Not Est.
	HC		5.11	Transfer of Total Assets; ERC Cost Not Est.
	HC		8.2125	Transfer of Total Assets; ERC Cost Not Est.
	HC		8.2125	Transfer of Total Assets; ERC Cost Not Est.
	HC		16.9725	Transfer of Total Assets; ERC Cost Not Est.
	HC	$384	36.5	
	HC	$2,740	11.1325	
	HC	$3,836	1.46	
	HC	$3,973	10.7675	
	HC	$3,973	1.095	
	HC	$4,110	71.54	
	HC	$4,110	1.095	
	HC	$4,110	8.2125	
	HC	$4,110	64.24	
	HC	$4,384	0.5475	
	HC	$4,384	28.2875	

TABLE 2 (cont.)

1997 California
Emission Reduction Credit Transaction Costs By District
Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	HC	$4,384	4.5625	
	HC	$4,384	105.6675	
	HC	$4,658	2.7375	
	HC	$4,658	0.1825	
	HC	$4,658	0.1825	
	HC	$4,932	7.8475	
	HC	$4,932	6.0225	
	HC	$5,310	0.1825	
	HC	$5,479	12.775	
	HC	$5,479	5.475	
	HC	$5,479	3.285	
	HC	$5,479	0.365	
	HC	$5,479	1.095	
	HC	$5,479	9.49	
	HC	$5,479	3.65	
	HC	$5,479	0.365	
	HC	$5,653	0.365	
	HC	$5,655	1.2775	
	HC	$5,753	2.7375	
	HC	$5,753	4.745	
	HC	$5,753	1.825	
	HC	$5,784	16.425	
	HC	$6,575	0.1825	
	HC	$6,849	0.5475	
	PM10		4.1975	Transfer of Total Assets; ERC Cost Not Est.
	PM10	$9,589	27.375	
	PM10	$9,863	0.9125	
	PM10	$9,863	4.745	
	PM10	$9,863	1.095	
	PM10	$9,863	6.935	
	PM10	$9,863	1.2775	
	PM10	$9,863	21.3525	
	PM10	$10,959	0.9125	
	PM10	$10,959	4.745	
	PM10	$11,507	0.365	
	PM10	$11,507	0.5475	
	PM10	$11,507	2.555	
	PM10	$13,562	1.825	
	PM10	$13,699	0.1825	
	PM10	$14,247	0.9125	
	PM10	$15,068	0.1825	
	PM10	$15,068	0.1825	
	PM10	$16,438	0.9125	
	PM10	$16,438	2.555	

TABLE 2 (cont.)

1997 California

Emission Reduction Credit Transaction Costs By District

Reported in Total Tons

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	PM10	$16,438	4.745	
	CO		0.1825	Transfer of Total Assets; ERC Cost Not Est.
	CO		1.095	Transfer of Total Assets; ERC Cost Not Est.
	CO		1.6425	Transfer of Total Assets; ERC Cost Not Est.
	CO		2.555	Transfer of Total Assets; ERC Cost Not Est.
	CO		16.9725	Transfer of Total Assets; ERC Cost Not Est.
	CO	$3,425	19.345	
	CO	$10,959	0.1825	
Ventura County	NOx	$2,000	8.56	1-Year Lease
	NOx	$2,600	11	1-Year Lease
	HC	$2,000	3	1-Year Lease
	HC	$2,000	18	1-Year Lease
	HC	$2,000	18	1-Year Lease
	HC	$20,000	3	
	HC	$25,000	18	

TABLE 3

Districts With No Offset Transactions to Report in 1997

Amador County Air Pollution Control District
Antelope Valley Air Pollution Control District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District
Feather River Air Quality Management District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Kern County Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Mojave Desert Air Quality Management District
Monterery Bay Unified Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
Placer County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District
Yolo-Solano Air Pollution Control District

Table 4

1997 California

NOx Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Sacramento Metropolitan	$20,000	1	
San Diego	$18,000	21.9	
San Joaquin Valley Unified	$6,625	6.42	Credits Valid in 2nd and 3rd Quarters
	$11,562	5.35	
San Luis Obispo	$3,000	5.7	Barter Transaction
South Coast	$5,814	1.46	
	$8,219	9.6725	
	$10,959	0.5475	
	$10,959	1.46	
	$10,959	1.2775	
	$10,959	0.73	
	$11,096	1.825	
	$11,342	0.365	
	$11,342	10.4025	
	$11,414	2.19	
	$11,507	2.92	
	$11,507	3.8325	
	$11,507	0.5475	
	$11,781	0.1825	
	$11,781	1.825	
	$12,521	30.8425	
	$13,699	0.5475	
	$13,699	12.775	
	$13,699	8.395	
	$13,699	5.11	
	$13,699	11.4975	
	$13,699	5.2925	
	$14,247	2.19	
	$15,068	0.1825	
Ventura County	$2,000	8.56	1-Year Lease
	$2,600	11	1-Year Lease

TABLE 5

1997 Summary Statistics For a Total of 31 NOx Transactions*

	$/ton	Tons
Total		176
Average (mean)	$11,257	
Median	$11,507	
High	$20,000	
Low	$2,000	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 1

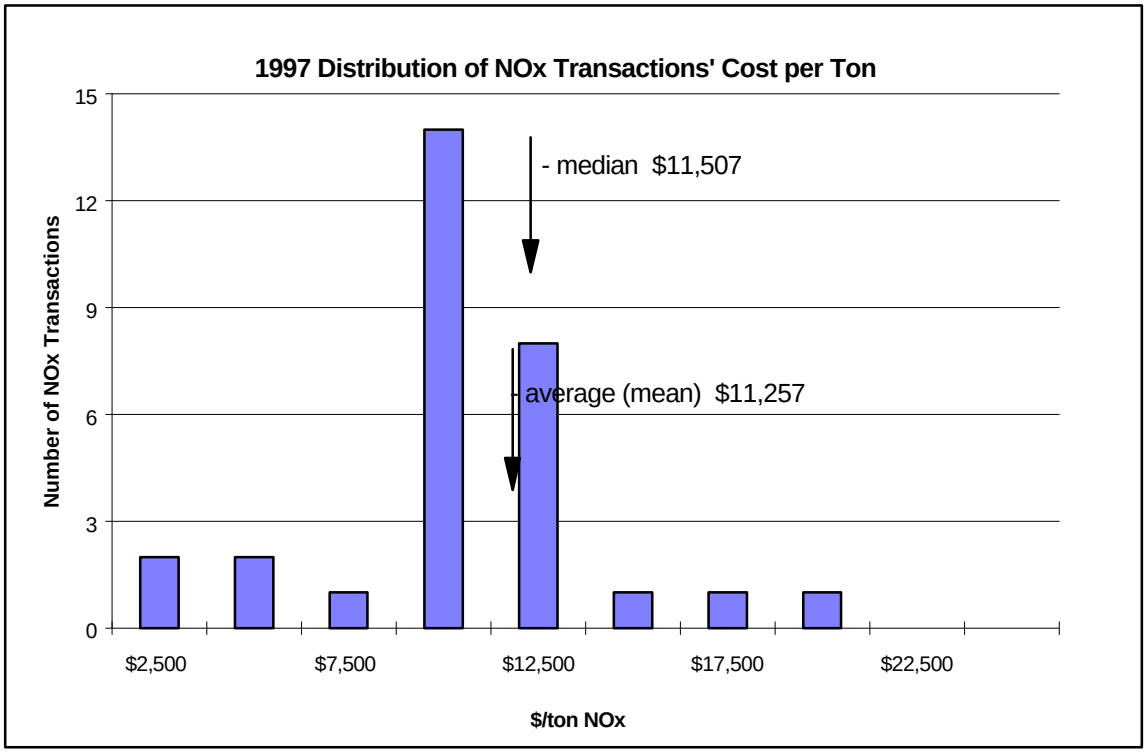


TABLE 6

1997 California

HC Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
Bay Area	$5,000	11.62	
Imperial County	$2,000	3.45	
Sacramento Metropolitan	$20,000	0.2	
San Diego	$667	17.35	1-Year Lease
	$1,200	13.8	1-Year Lease
	$9,000	48	
	$9,865	48	
	$11,000	13	
	$11,000	46	
	$13,169	46	
San Joaquin Valley	$4,875	3.56	
South Coast	$384	36.5	
	$2,740	11.1325	
	$3,836	1.46	
	$3,973	10.7675	
	$3,973	1.095	
	$4,110	71.54	
	$4,110	1.095	
	$4,110	8.2125	
	$4,110	64.24	
	$4,384	0.5475	
	$4,384	28.2875	
	$4,384	4.5625	
	$4,384	105.6675	
	$4,658	2.7375	
	$4,658	0.1825	
	$4,658	0.1825	
	$4,932	7.8475	
	$4,932	6.0225	
	$5,310	0.1825	
	$5,479	12.775	
	$5,479	5.475	
	$5,479	3.285	
	$5,479	0.365	
	$5,479	1.095	
	$5,479	9.49	
	$5,479	3.65	
	$5,479	0.365	
	$5,653	0.365	

Table 6 (cont.)

1997 California

HC Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
South Coast (continued)	$5,655	1.2775	
	$5,753	2.7375	
	$5,753	4.745	
	$5,753	1.825	
	$5,784	16.425	
	$6,575	0.1825	
	$6,849	0.5475	
Ventura County	$2,000	3	1-Year Lease
	$2,000	18	1-Year Lease
	$2,000	18	1-Year Lease
	$20,000	3	
	$25,000	18	

TABLE 7

1997 'Summary Statistics For a Total of 51 HC Transactions*

	$/ton	Tons
Total		737.8475
Average (mean)	$6,047	
Median	$5,000	
High	$25,000	
Low	$384	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 2

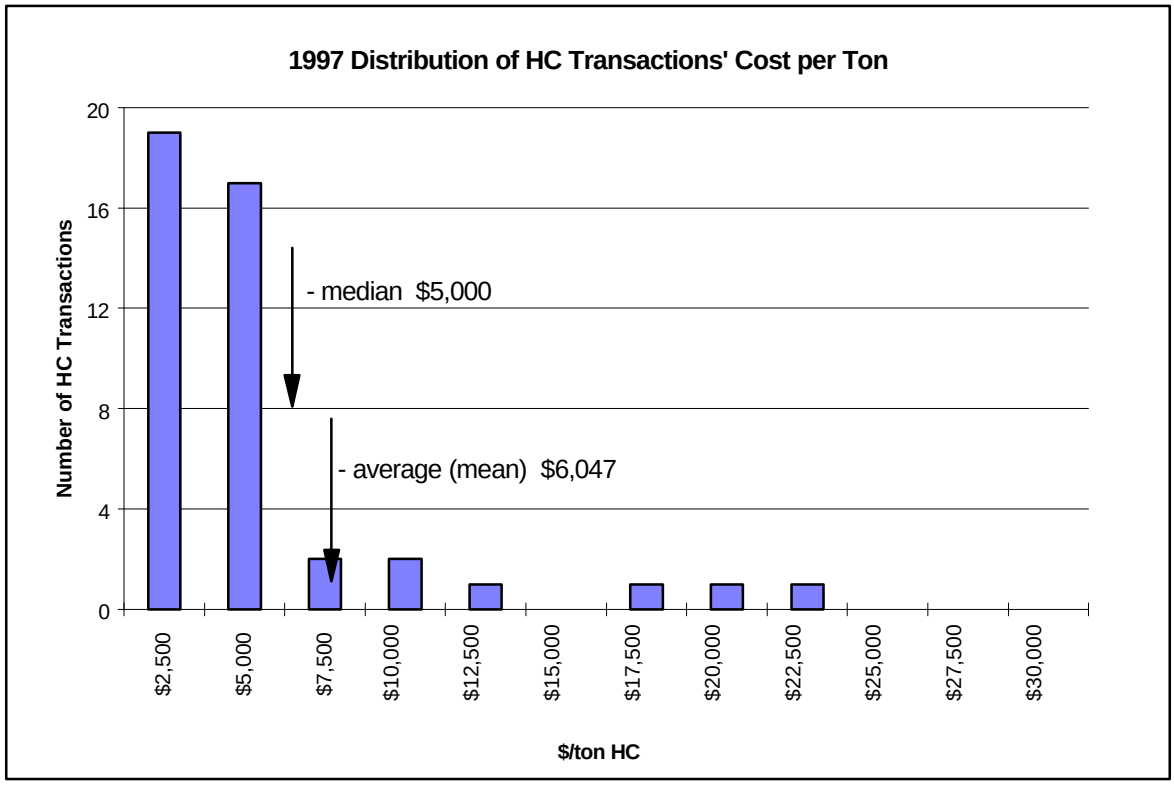


TABLE 8

1997 California

PM10, CO, and SOx Emission Reduction Credit Transaction Costs

Reported in Total Tons

District	$/ton	Tons	Notes
PM10 Transactions			
San Diego County	$9,000	2	
San Joaquin Valley Unified	$10,579	0.4	
Shasta County	$400	0.126	
South Coast	$9,589	27.375	
	$9,863	0.9125	
	$9,863	4.745	
	$9,863	1.095	
	$9,863	6.935	
	$9,863	1.2775	
	$9,863	21.3525	
	$10,959	0.9125	
	$10,959	4.745	
	$11,507	0.365	
	$11,507	0.5475	
	$11,507	2.555	
	$13,562	1.825	
	$13,699	0.1825	
	$14,247	0.9125	
	$15,068	0.1825	
	$15,068	0.1825	
	$16,438	0.9125	
	$16,438	2.555	
	$16,438	4.745	
CO Transactions			
San Joaquin Valley Unified	$6,703	6.595	Credits Valid in 2nd and 3rd Quarters
South Coast	$3,425	19.345	
	$10,959	0.1825	
SOx Transactions			
San Joaquin Valley Unified	$5,200	10.92	

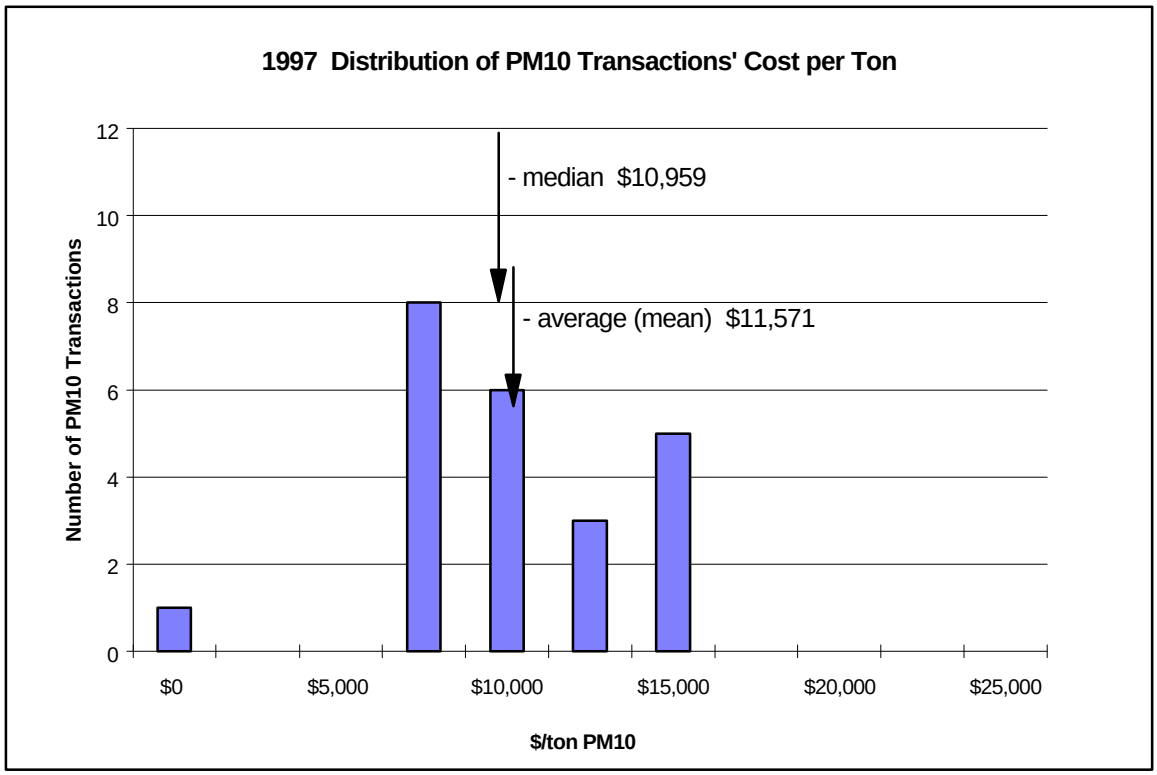
TABLE 9

1997 Summary Statistics For a Total of 23 PM10 Transactions*

	$/ton	Tons
Total		86.841
High	$16,438	
Average (mean)	$11,571	
Median	$10,959	
Low	$400	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 3



FIVE YEAR OFFSET TRANSACTION TRENDS

This is the fifth year (1993-1997) we have collected data statewide about the cost of offset transactions as required by AB3785, which the California Legislature passed in 1992. Based upon this five year period we begin to see trends such as the cost per ton by pollutant, cost of pollutant per ton by district, or number of emission credit transactions. The following summary charts illustrate these trends. For purposes of comparison, the 1996, 1995, 1994 and 1993 emission reduction credits transactions are included in Appendices A, B, C, and D respectively.

Summary Chart A illustrates that the trend for the cost of NOx emission credits has shown a decrease since 1993 both in the average high cost as well as the from the average mean cost.

Summary Chart B illustrates that the trend for the costs for hydrocarbon emission credits has also shown a decrease since 1993 both in the average high cost as well as the average mean cost.

Summary Chart C illustrates that the trend for the cost for PM10 emission credits decreased from 1993 to 1995 but has since shown a slight increase.

Summary Chart D illustrates that hydrocarbon emission credits are traded most frequently with a steady increase since 1995. The number of NOx transactions shows a fluctuation with the highest number of transactions occurring in 1994 and 1997 (38 and 36 transactions respectively). PM10 transactions have shown an increase in overall number of transactions but are traded less frequently than hydrocarbon and NOx emission credits. The number of CO transactions has averaged only 5 transactions per year from all Districts, whereas the number of SOx transactions has averaged less than 3 transactions per year from all Districts.

Summary Chart E illustrates that the number of tons of hydrocarbon emission credits traded out-numbered all other pollutants traded except for NOx in 1994. It also shows an increasing trend in number of tons traded since 1994 with a total of 830 tons of hydrocarbon emission credits traded in 1997. NOx is the second leading number of tons of emission credits traded with a fluctuating market. The high for NOx was in 1994 with 645.45 tons traded. The tons of SOx emission credits were at a high in 1993 with 345.85 tons traded, yet have shown little trading since. The tons of PM10 emissions credits traded was at a high of 250.84 tons in 1995 yet has been decreasing since 1995.

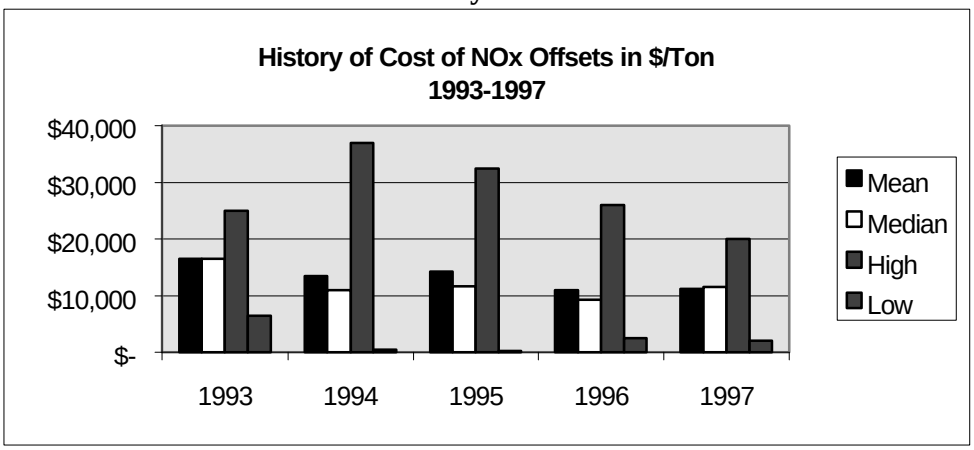
Summary Chart F illustrates that South Coast AQMD is the leader in the number of emission credit transactions in all years except 1995 with a high of 145 transaction in 1997. San Joaquin Valley Unified APCD is second in the number of emission credit transactions and has shown an increase in all years except 1997. The number of emission credit transactions in the Bay Area AQMD has steadily decreased from 12 in 1993 to 1 in 1997. This Bay Area AQMD trend corresponds to a change in their banking rules which allowed sources between 15 and 50 tons per year to receive offsets from a community bank instead of having to purchase credits on the open market.

Summary Chart G breaks down the cost of NOx emission reduction credits (in $/ton) by District, but includes only the Districts with the most number of emission transactions. Gaps in data indicate that no emission credit trading took place the reference year. Sacramento Metropolitan AQMD leads all other Districts for the high cost of NOx emission credits with a high of $32,400/ton and an average of $23,022/ton over the past 5 years. Ventura County APCD is second in the high cost of NOx emission credits with a 5 year average cost of $18,420/ton. The trend of the cost of NOx emission credits fluctuates with the number of credits traded.

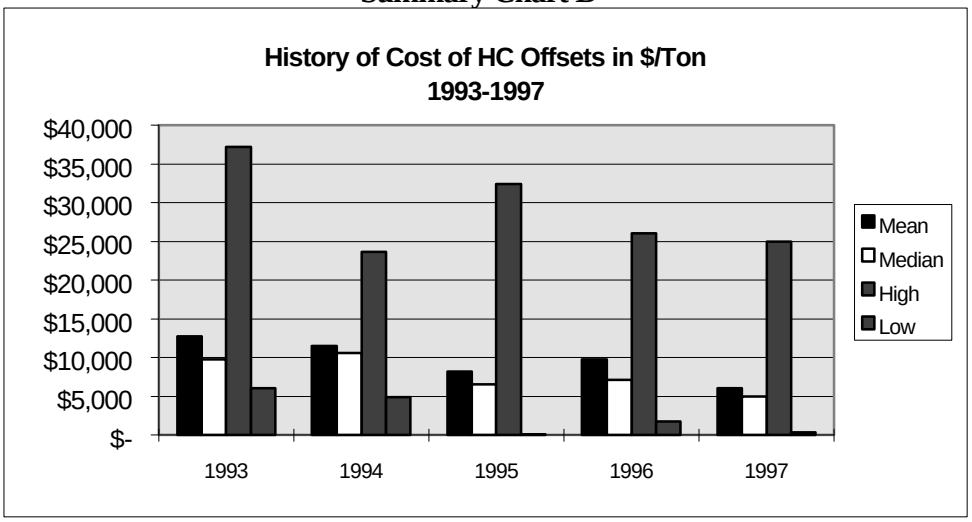
Summary Chart H breaks down the cost of hydrocarbon emission reduction credits (in $/ton) by District, but includes only the Districts with the most number of emission transactions. Sacramento Metropolitan AQMD also leads all other Districts in the cost per ton of hydrocarbon emission credits with a high of $32,400/ton and a 5 year average of $18,221/ton. Ventura Country APCD is second with a 5 year average of $10,469. The trend of the cost of hydrocarbon emissions has decreased since 1993.

Summary Chart I breaks down the cost of PM10 (in $/ton) by District, but also includes only the Districts with most number of emission transactions. Sacramento Metropolitan AQMD again leads all other Districts in the cost per ton of PM10 with a high of $25,000 in 1993. Bay Area AQMD follows in 1994 with the average cost of PM10 at $22,000/ton. The trend of the cost of PM10 emission credits fluctuates with the number of credits traded and the District in which it was traded.

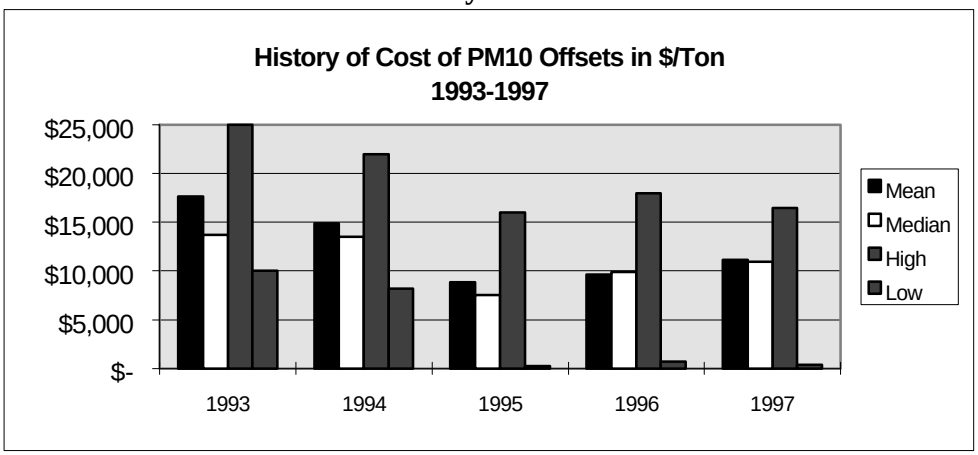
Summary Chart A



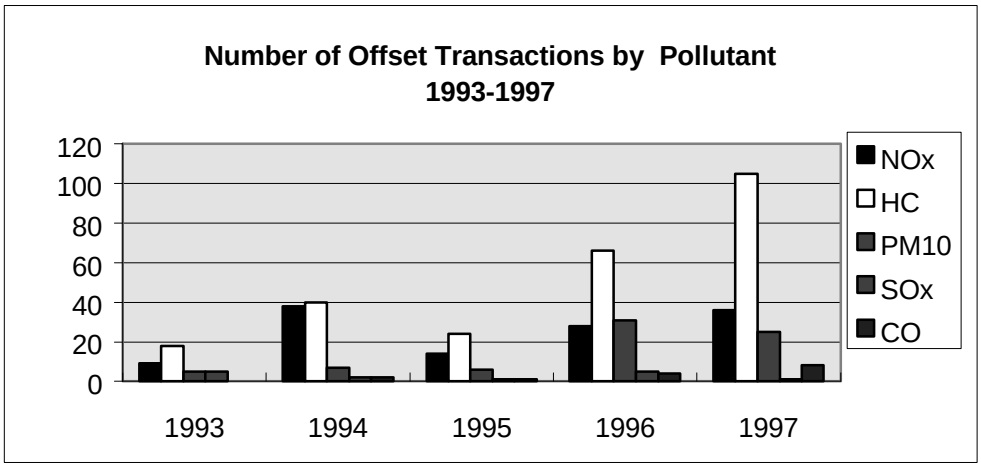
Summary Chart B



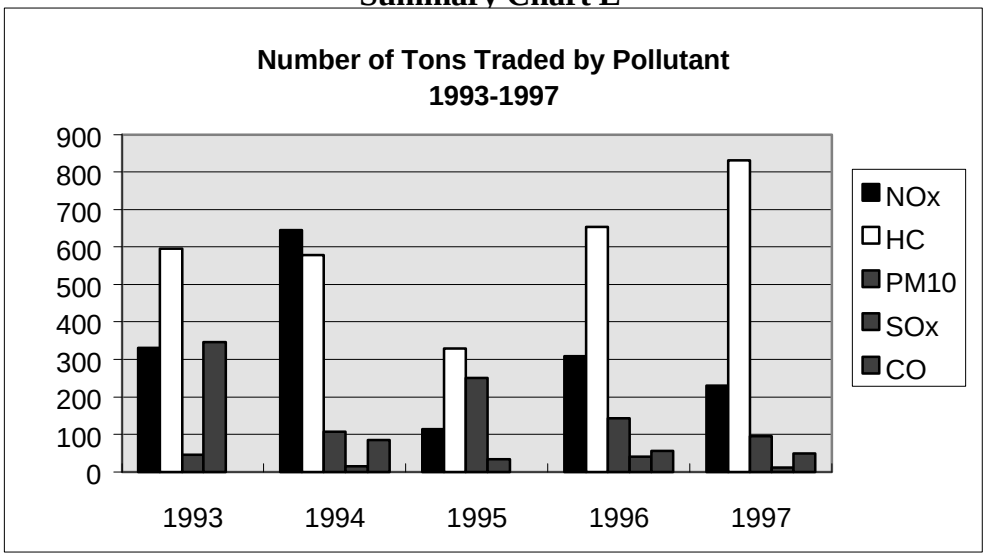
Summary Chart C



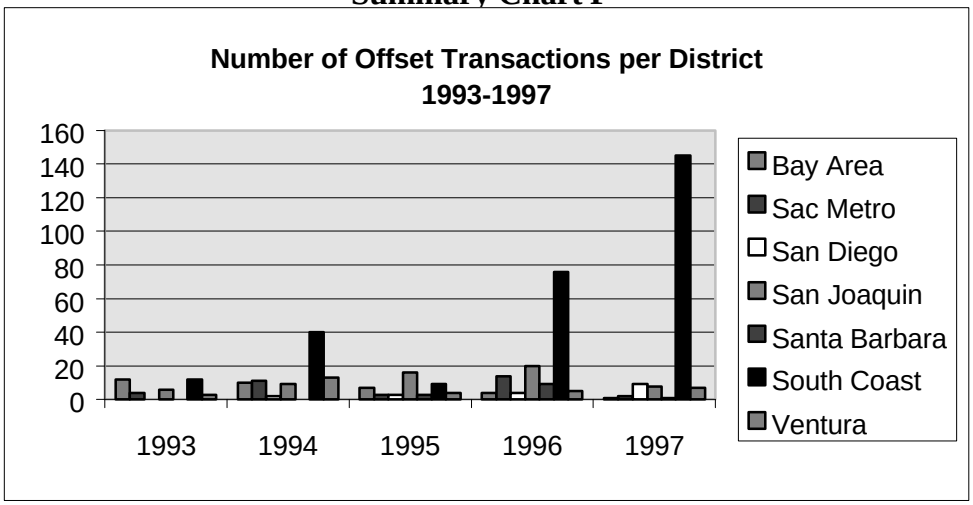
Summary Chart D



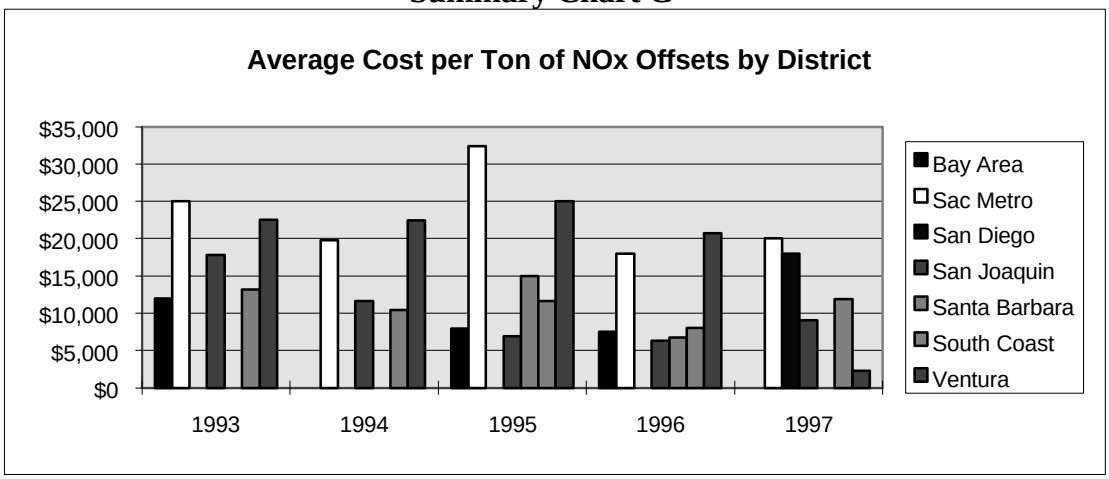
Summary Chart E



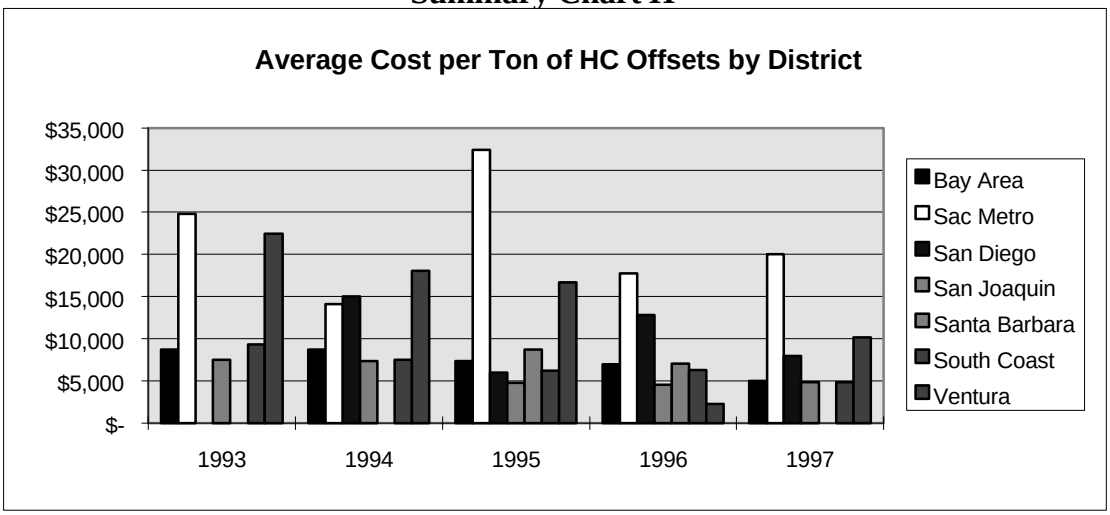
Summary Chart F



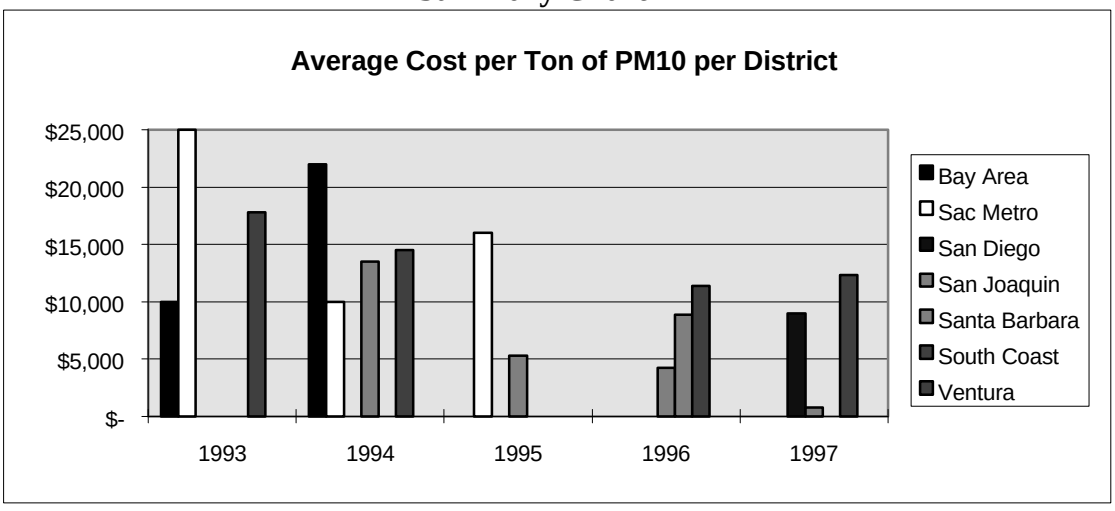
Summary Chart G



Summary Chart H



Summary Chart I



APPENDIX C: 1996 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF DATA

The emission reduction credits transactions reported by the districts are presented in Table 2, Table 4, Table 6, and Table 8. These tables are grouped by pollutant, and separately report NOx, HC, PM10, CO and SOx transactions. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Barter and subsidiary transactions that do not have an associated cost are listed at the beginning of each district's transactions.

Table 5, Table 7, and Table 9 summarize the data of each preceding table. The summary tables include the average or mean, the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude asset transfer, subsidiary, barter, and other non-monetary transactions where there were no associated costs to include in the calculations.

Chart 1, Chart 2, and Chart 3 are histograms of Tables 4, 6, and 8 respectively. (A histogram gives the cumulative frequency of data points falling within a specified range. For example, in Table 8 there are two PM10 transactions between $0 and $2,499, three transactions between $2,500 and $4,999, no transactions between $5,000 and $7,499, twelve transactions between $7,500 and $9,999, four transactions between $10,000 and $12,499, four transactions between $12,500 and $14,999, no transactions between $15,000 and $17,499, and one transaction between $17,500 and $19,999. These are reflected in Chart 3.)

Table 2 presents all of the transactions taking place within a district. There were a total of 136 transactions statewide in 1996. Two of the transactions were not included in this summary because, for one, the transaction involved a non-criteria pollutant (SO4), and, for the other, the price paid per ton ($66,667) for a very small quantity (0.015) would have skewed the average and median price paid in dollars per ton for offsets. Eight of the transactions involved one subsidiary and seven barter transactions; and there was one barter and one subsidiary transaction for which no costs were reported. There were four CO transactions, one with cost information ($2,446/ton); and five SOx transactions, three with costs information ($552, $5,850, and $25,000/ton), and two were without costs information. The South Coast had 27 transactions that were non-monetary (refer to Table 2, South Coast, begining on page 8 for details). Of the remaining transactions, excluding all those that were non-monetary, barter or subsidiary transactions, 21 transactions were NOx transactions, 54 were HC transactions, 26 were PM10 transactions, 1 was a CO transaction, and 3 were SOx transactions. All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1996.

As shown in Table 5, the median price per ton of NOx was $9,250 and the average price was $10,999; the high price per ton of NOx was $26,000 and the low was $2,460, which was for 2-year mobile source credits. As shown in Table 7, the median price per ton of HC was $7,123 and the average price was $9,734. The high price per ton of HC was $26,000, and low was $1,726.

Table 8 includes the cost of PM10, CO, and SOx transactions. There were only one CO transaction and three SOx transactions. As shown in Table 9, with 26 PM10 transactions, the median and average price per ton were $9,863 and $9,612 respectively, the high price per ton of PM10 was $18,000 and the low was $708. For purposes of comparison, the 1995, 1994, and 1993 emission reduction credits transactions are included in Appendeces A, B, and C respectively.

Table 2

1996 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
Bay Area	NOx	$7,500	90	
Total of 4 Transactions	HC	$6,500	101.81	
	HC	$7,000	102.6	
	HC	$7,500	4.24	
Placer County	NOx	$18,000	3.4	
Total of 2 Transactions	PM10	$18,000	5.1	
Sacramento Metropolitan	NOx	$17,963	0.2	Lease for 2 years
Total of 14 Transactions	NOx	$17,963	0.21	Lease for 2 years
	NOx	$17,963	39.4	Lease for 3 years
	HC	$17,796	0.04	Lease for 3 years
	HC	$17,796	0.12	Lease for 2 years
	HC	$17,796	0.35	Lease for 2 years
	HC	$17,796	0.4	Lease for 1 year
	HC	$17,796	0.68	Lease for 3 years
	HC	$17,796	0.68	Lease for 3 years
	HC	$17,796	0.68	Lease for 3 years
	HC	$17,796	1.3	Lease for 2 years
	HC	$17,796	2.37	Lease for 3 years
	HC	$17,796	2.37	Lease for 3 years
	HC	$17,796	5.2	Lease for 1 year
San Diego County	HC	$10,500	32	
Total of 4 Transactions	HC	$11,000	45	
	HC	$15,000	4.1	
	HC	$15,000	9	
San Joaquin Valley Unified	NOx	$3,680	1.87	
Total of 20 Transactions	NOx	$3,687	0.678	
	NOx	$4,050	7.73	
	NOx	$9,250	30	Barter Transaction
	NOx	$10,719	1.31	
	HC	$3,096	50.07	
	HC	$3,287	1.64	
	HC	$7,400	30	Barter Transaction
	PM10	$708	12.366	
	PM10	$1,182	7.19	
	PM10	$2,542	1.18	
	PM10	$3,000	2.13	
	PM10	$4,000	7	Barter Transaction
	PM10	$8,767	7.45	
	PM10	$9,187	4.52	

TABLE 2 (cont.)

1996 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
San Joaquin Valley Unified (continued)	CO	$2,446	0.092	
	SOx		6.2	Barter Transaction
	SOx	$552	13.58	
	SOx	$5,850	20	Barter Transaction
	SOx	$25,000	0.001	
Santa Barbara County Total of 9 Transactions	NOx		4.24	Subsidiary Transaction No Limit
	NOx	$2,460	44.68	2 Year Mobile Source Credit
	NOx	$5,407	4.72	10 Year Mobile Source Credit
	NOx	$5,407	8.55	10 Year Mobile Source Credit
	NOx	$5,407	12.83	10 Year Mobile Source Credit
	NOx	$15,279	5.94	Barter Transaction No Limit
	HC	$5,407	1	10 Year Mobile Source Credit
	HC	$8,731	10.5	Barter Transaction No Limit
	PM10	$8,879	9.64	2 Year Stationary Source Credit
South Coast Total of 76 Transactions	NOx		1.46	Assets Transfer - $0 Exchanged
	NOx		3.47	Assets Transfer - $0 Exchanged
	NOx		7.48	Trans. Between Local Agencies
	NOx		7.48	Transaction Cost N/A
	NOx		34.86	Transaction Cost N/A
	NOx		34.86	Trans. Between Local Agencies
	NOx	$6,575	0.73	Mobile Source Transaction
	NOx	$6,612	29.93	Mobile Source Transaction
	NOx	$11,052	3.47	
	HC		0.55	Assets Transfer - $0 Exchanged
	HC		2.74	Trans. of 2 Co. Same Owner $0
	HC		2.74	Trans. of 2 Co. Same Owner $0
	HC		5.29	Transaction Cost N/A
	HC		8.21	Assets Transfer - $0 Exchanged
	HC		9.31	Trans. of 2 Co. Same Owner $0
	HC		10.22	Transaction Cost N/A
	HC		10.4	Trans. of 2 Co. Same Owner $0
	HC		10.4	Trans. of 2 Co. Same Owner $0
	HC		10.77	Assets Transfer - $0 Exchanged
	HC		10.77	Assets Transfer - $0 Exchanged
	HC		12.78	Assets Transfer - $0 Exchanged
	HC	$1,726	7.67	
	HC	$2,740	5.84	
	HC	$5,068	3.65	
	HC	$5,068	6.21	
	HC	$5,068	7.67	
	HC	$5,479	3.65	
	HC	$5,479	6.21	

TABLE 2 (cont.)

1996 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	HC	$5,479	9.13	
	HC	$5,658	0.91	
	HC	$5,748	12.78	
	HC	$6,000	6.39	
	HC	$6,575	14.05	
	HC	$6,849	1.28	
	HC	$7,026	0.37	
	HC	$7,123	0.18	
	HC	$7,123	0.18	
	HC	$7,123	0.18	
	HC	$7,123	0.18	
	HC	$7,123	0.37	
	HC	$7,123	0.55	
	HC	$7,123	0.73	
	HC	$7,123	1.1	
	HC	$7,123	1.46	
	HC	$7,123	1.46	
	HC	$7,123	2.19	
	HC	$7,288	10.4	
	HC	$7,499	12.96	
	HC	$8,132	30.66	
	HC	$8,219	2.01	
	PM10		2.19	Assets Transfer - $0 Exchanged
	PM10		6.39	Transaction Cost N/A
	PM10		10.04	Trans. of 2 Co. Same Owner $0
	PM10		12.96	Trans. of 2 Co. Same Owner $0
	PM10		21.35	Trans. of 2 Co. Same Owner $0
	PM10	$9,863	0.18	
	PM10	$9,863	0.18	
	PM10	$9,863	0.37	
	PM10	$9,863	0.37	
	PM10	$9,863	0.55	
	PM10	$9,863	0.55	
	PM10	$9,863	0.73	
	PM10	$9,863	1.83	
	PM10	$9,863	5.11	
	PM10	$11,014	0.37	
	PM10	$12,422	0.18	
	PM10	$12,422	0.18	
	PM10	$12,422	0.18	
	PM10	$13,299	1.1	
	PM10	$13,699	9.86	
	PM10	$14,795	3.29	
	PM10	$14,795	7.67	

TABLE 2 (cont.)

1996 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
South Coast (continued)	CO		0.73	Trans. of 2 Co. Same Owner $0
	CO		17.34	Assets Transfer - $0 Exchanged
	CO		36.5	Trans. of 2 Co. Same Owner $0
	SOx		0.18	Assets Transfer - $0 Exchanged
Ventura County Total of 5 Transactions	NOx	$10,000	2.5	
	NOx	$26,000	0.43	
	NOx	$26,000	8	
	HC	$20,000	3	
	HC	$26,000	0.04	

TABLE 3

Districts With No Offset Transactions to Report in 1996

Amador County Air Pollution Control District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District
Feather River Air Quality Management District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Imperial County Air Pollution Control District
Kern County Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Mojave Desert Air Quality Management District
Monterery Bay Unified Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Shasta County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District
Yolo-Solano Air Pollution Control District

TABLE 4

1996 California

NOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
Bay Area	$7,500	90	
Placer County	$18,000	3.4	
Sacramento Metropolitan	$17,963	0.2	Lease for 2 years
	$17,963	0.21	Lease for 2 years
	$17,963	39.4	Lease for 3 years
San Joaquin Valley Unified	$3,680	1.87	
	$3,687	0.678	
	$4,050	7.73	
	$9,250	30	Barter Transaction
	$10,719	1.31	
Santa Barbara County	$2,460	44.68	2 Year Mobile Source Credit
	$5,407	4.72	10 Year Mobile Source Credit
	$5,407	8.55	10 Year Mobile Source Credit
	$5,407	12.83	10 Year Mobile Source Credit
	$15,279	5.94	Barter Transaction No Limit
South Coast	$6,575	0.73	Mobile Source Transaction
	$6,612	29.93	Mobile Source Transaction
	$11,052	3.47	
Ventura County	$10,000	2.5	
	$26,000	0.43	
	$26,000	8	

TABLE 5

Summary Statistics For a Total of 21 NOx Transactions*

	$/ton	Tons
Total		296.578
Average (mean)	$10,999	
Median	$9,250	
High	$26,000	
Low	$2,460	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 1

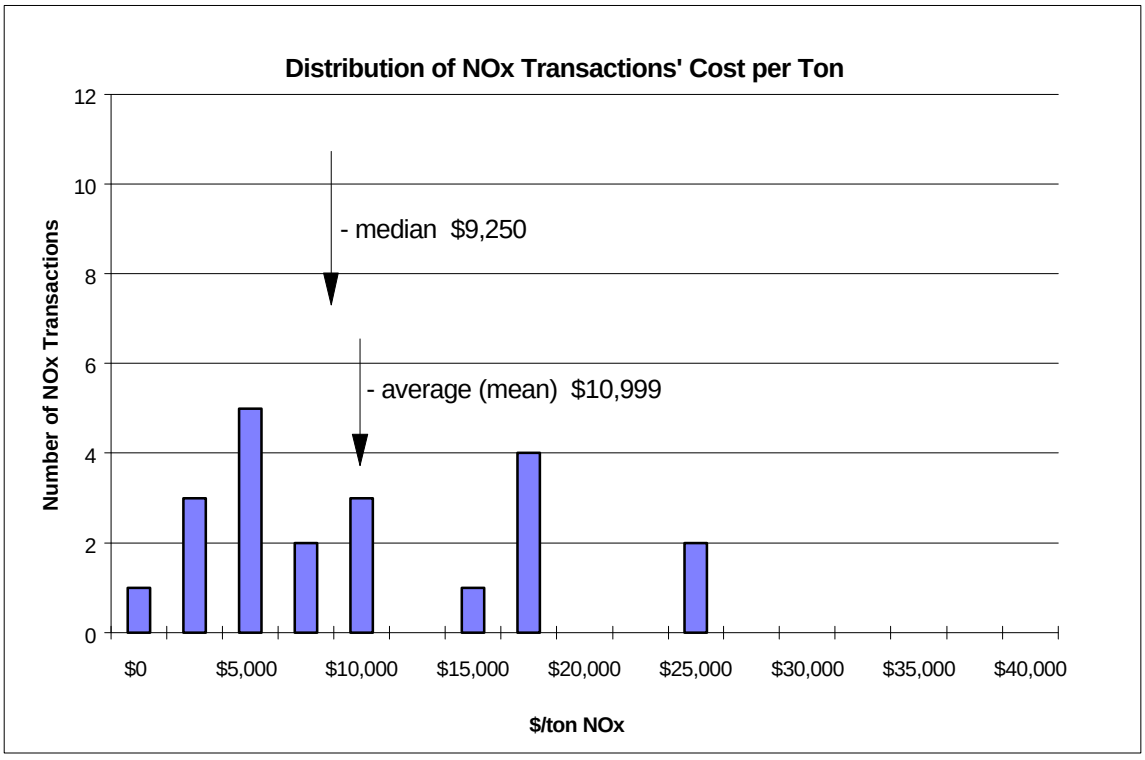


TABLE 6

1996 California

HC Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
Bay Area	$6,500	101.81	
	$7,000	102.6	
	$7,500	4.24	
Sacramento Metropolitan	$17,796	0.04	Lease for 3 years
	$17,796	0.12	Lease for 2 years
	$17,796	0.35	Lease for 2 years
	$17,796	0.4	Lease for 1 year
	$17,796	0.68	Lease for 3 years
	$17,796	0.68	Lease for 3 years
	$17,796	0.68	Lease for 3 years
	$17,796	1.3	Lease for 2 years
	$17,796	2.37	Lease for 3 years
	$17,796	2.37	Lease for 3 years
	$17,796	5.2	Lease for 1 year
San Diego County	$10,500	32	
	$11,000	45	
	$15,000	4.1	
	$15,000	9	
San Joaquin Valley Unified	$3,096	50.07	
	$3,287	1.64	
	$7,400	30	Barter Transaction
Santa Barbara County	$5,407	1	10 Year Mobile Source Credit
	$8,731	10.5	Barter Transaction No Limit
South Coast	$1,726	7.67	
	$2,740	5.84	
	$5,068	3.65	
	$5,068	6.21	
	$5,068	7.67	
	$5,479	3.65	
	$5,479	6.21	
	$5,479	9.13	
	$5,658	0.91	
	$5,748	12.78	
	$6,000	6.39	
	$6,575	14.05	
	$6,849	1.28	
	$7,026	0.37	
	$7,123	0.18	

TABLE 6 (cont.)

1996 California

HC Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
South Coast (continued)	$7,123	0.18	
	$7,123	0.18	
	$7,123	0.18	
	$7,123	0.37	
	$7,123	0.55	
	$7,123	0.73	
	$7,123	1.1	
	$7,123	1.46	
	$7,123	1.46	
	$7,123	2.19	
	$7,288	10.4	
	$7,499	12.96	
	$8,132	30.66	
	$8,219	2.01	
Ventura County	$20,000	3	
	$26,000	0.04	

TABLE 7

Summary Statistics For a Total of 54 HC Transactions*

	$/ton	Tons
Total		559.61
Average (mean)	$9,734	
Median	$7,123	
High	$26,000	
Low	$1,726	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 2

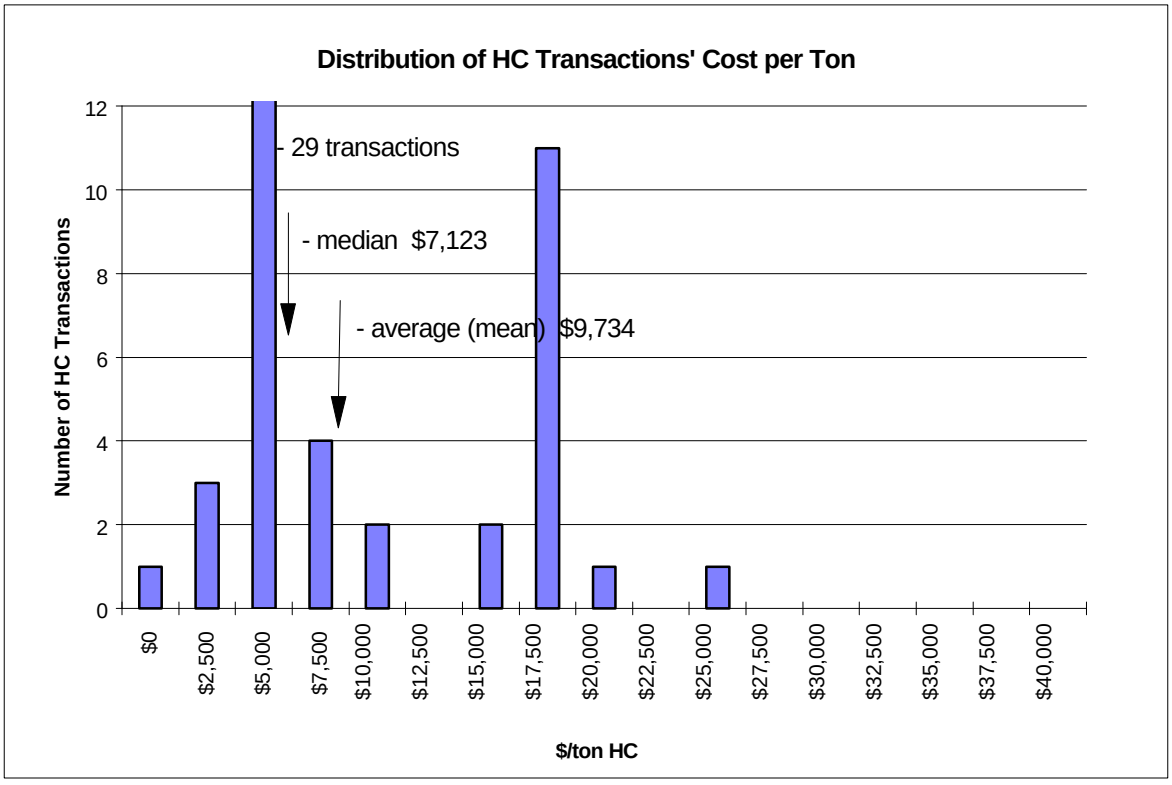


TABLE 8

1996 California

PM10, CO, and SOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
PM10 Transactions			
Placer County	$18,000	5.1	
San Joaquin Valley Unified	$708	12.37	
	$1,182	7.19	
	$2,542	1.18	
	$3,000	2.13	
	$4,000	7	Barter Transaction
	$8,767	7.45	
	$9,187	4.52	
Santa Barbara County	$8,879	9.64	2 Year Stationary Source Credit
South Coast	$9,863	0.18	
	$9,863	0.18	
	$9,863	0.37	
	$9,863	0.37	
	$9,863	0.55	
	$9,863	0.55	
	$9,863	0.73	
	$9,863	1.83	
	$9,863	5.11	
	$11,014	0.37	
	$12,422	0.18	
	$12,422	0.18	
	$12,422	0.18	
	$13,299	1.1	
	$13,699	9.86	
	$14,795	3.29	
	$14,795	7.67	
CO Transactions			
San Joaquin Valley Unified	$2,446	0.092	
SOx Transactions			
San Joaquin Valley Unified	$552	13.58	
	$5,850	20	Barter Transaction
	$25,000	0.001	

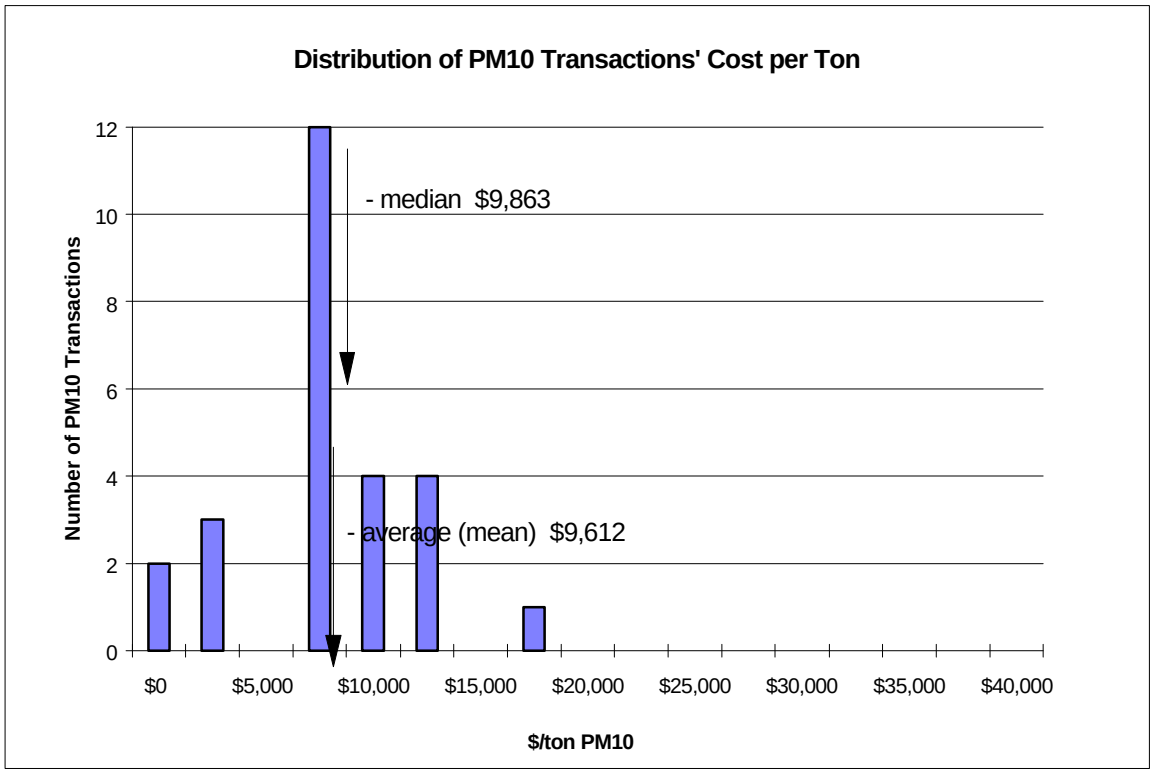
TABLE 9

Summary Statistics For a Total of 26 PM10 Transactions*

	$/ton	Tons
Total		89.28
High	$18,000	
Average (mean)	$9,612	
Median	$9,863	
Low	$708	

* Excludes asset transfer, subsidiary, barter, and other non-monetary transactions with no cost data.

CHART 3



APPENDIX D: 1995 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF 1995 DATA

The emission reduction credits transactions reported by the districts are presented in Table 2, Table 4, Table 6, and Table 8. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Barter and subsidiary transactions usually do not have an associate cost and are listed at the beginning of each districts' transactions.

Additionally, Table 4, Table 6, and Table 8 are grouped by and report NOx, HC, and PM10 transactions respectively.

Table 5, Table 7, and Table 9 summarize the data of each preceding table. The summary tables include the average or mean, the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude subsidiary and barter transactions where there were no associated cost to include in the calculations.

Chart 1, Chart 2, and Chart 3 are histograms of Tables 4, 6, and 8 respectively. (A histogram gives the cumulative frequency of data points falling within a specified range. For example, in Table 8 there is one PM10 transaction between $0 and $2,499, no transactions between $2,500 and $4,999, two transactions between $5,000 and $7,499,one transaction between $7,500 and $9,999, no transactions between $10,000 and $14,999, and two transactions between $15,000 and $17,499. These are reflected in Chart 3.)

Table 2 presents all of the transactions taking place within a district. There were a total of 46 transactions statewide in 1995. Two of the transactions involved subsidiary transactions, and three of the transactions involved barter transactions. Of those 41 transactions that were not barter or subsidiary transactions, 11 transactions were NOx transactions, 22 were HC transactions, 6 were PM10 transactions, 1 was a CO transaction, and 1 was a SOx transaction.

All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1995.

As shown in Table 5, the median price per ton of NOx was $11,644 and the average price was was $14,274; the high price per ton of NOx was $32,400 and the low was $268, where the credits were valid only in the fourth quarter. As shown in Table 7, the median price per ton of HC was $6,575 and the average price was $8,158. The high price per ton of HC was $32,400 which was a 3 year mobile transaction, and the certified low was $45. Table 8 includes the cost of PM10, CO, and SOx transactions. There was only one CO transaction and one SOx transaction. Of those, the CO transaction was for credits valid for only 90 days. As shown in Table 9, with only 6 PM10 transactions, the average and median price per ton were $8,856 and $7,514 respectively, the high price per ton of PM10 was $16,000 and the low was $269, with credits valid only in the fourth quarter.

Table 2

1995 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
Bay Area	NOx		5.79	No cost - Barter transaction
Total of 7 Transactions	NOx	$8,000	30	
	HC	$450	30	
	HC	$6,500	33.46	
	HC	$6,739	31.4	Credits valid for 9 month lease*
	HC	$9,344	0.25	
	HC	$13,868	1.197	
		$7,380	96.307	
Placer County	PM10	$16,000	58.3	
Total of 1 Transaction				
Sacramento Metropolitan	NOx	$32,400	0.09	Mobile barter trans. for 3 years
Total of 3 Transactions	HC	$32,400	0.16	Mobile Barter trans. for 3 years
	PM10	$16,000	152.67	
San Diego County	HC	$45	93	
Total of 3 Transactions	HC	$8,000	10	
	HC	$10,000	2	
		$6,015	105	
San Joaquin Valley Unified	NOx	$268	0.59	Credits valid in 4th quarter
Total of 16 Transactions	NOx	$8,500	3	Credits valid in 2nd quarter
	NOx	$8,840	19.8	
	NOx	$10,000	6.5	
		$6,902	29.89	
	HC	$267	0.01	Credits valid in 4th quarter
	HC	$5,041	32.08	
	HC	$5,500	1	
	HC	$5,551	0.78	
	HC	$6,027	18.25	
	HC	$6,575	40.84	
		$4,827	92.96	
	PM10	$269	14.12	Credits valid in 4th quarter
	PM10	$5,840	1	
	PM10	$5,848	0.08	
	PM10	$9,180	24.67	
		$5,284	39.87	
	CO	$267	0.15	Credits valid in 4th quarter
	SOx	$5,200	33.3	

***** Valid 1st, 3rd, and 4th quarters

TABLE 2 (cont.)

1995 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
South Coast	NOx		7.3	Subsidiary Transaction
Total of 9 Transactions	NOx	$11,233	4.93	
	NOx	$12,055	7.48	
	HC	$2,740	7.67	
	HC	$6,575	0.37	
	HC	$6,575	0.73	
	HC	$6,575	1.83	
	HC	$6,575	10.95	
	HC	$8,219	2.74	
Santa Barbara County	NOx	$15,000	12	Mobile Credits valid in 4th Quarter
Total of 3 Transactions	NOx	$15,000	17	Credits valid in 4th quarter
	HC	$8,731	2.85	No limit on length of life
Ventura County	NOx	$24,990	0.1	
Total of 4 Transactions	NOx	$25,000	0.15	
	HC	$11,000	3.46	Subsidiary transaction
	HC	$22,500	4.51	

TABLE 3

Districts With No Offset Transactions to Report in 1995

Amador County Air Pollution Control District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District
Feather River Air Quality Management District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Imperial County Air Pollution Control District
Kern County Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Mojave Desert Air Quality Management District
Monterery Bay Unified Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Shasta County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District
Yolo-Solano Air Pollution Control District

TABLE 4

1995 California

NOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
Bay Area		5.79	Barter Transaction
	$8,000	30	
Sacramento Metropolitan	$32,400	0.09	Mobile barter trans. for 3 years
San Joaquin	$268	0.59	Credits valid in 4th quarter
	$8,500	3	Credits valid in 2nd quarter
	$8,840	19.8	
	$10,000	6.5	
South Coast		7.3	Subsidiary Transaction
	$11,233	4.93	
	$12,055	7.48	
Santa Barbara County	$15,000	12	Mobile Credits valid in 4th quarter
	$15,000	17	Credits valid in 4th quarter
Ventura County	$24,990	0.1	
	$25,000	0.15	

TABLE 5

1995 Summary Statistics For a Total of 12 NOx Transactions*

	$/ton	Tons
Total		101.64
Average (mean)	$14,274	
Median	$11,644	
High	$32,400	
Low	$268	

* Excludes subsidiary and barter transactions with no cost data.

CHART 1

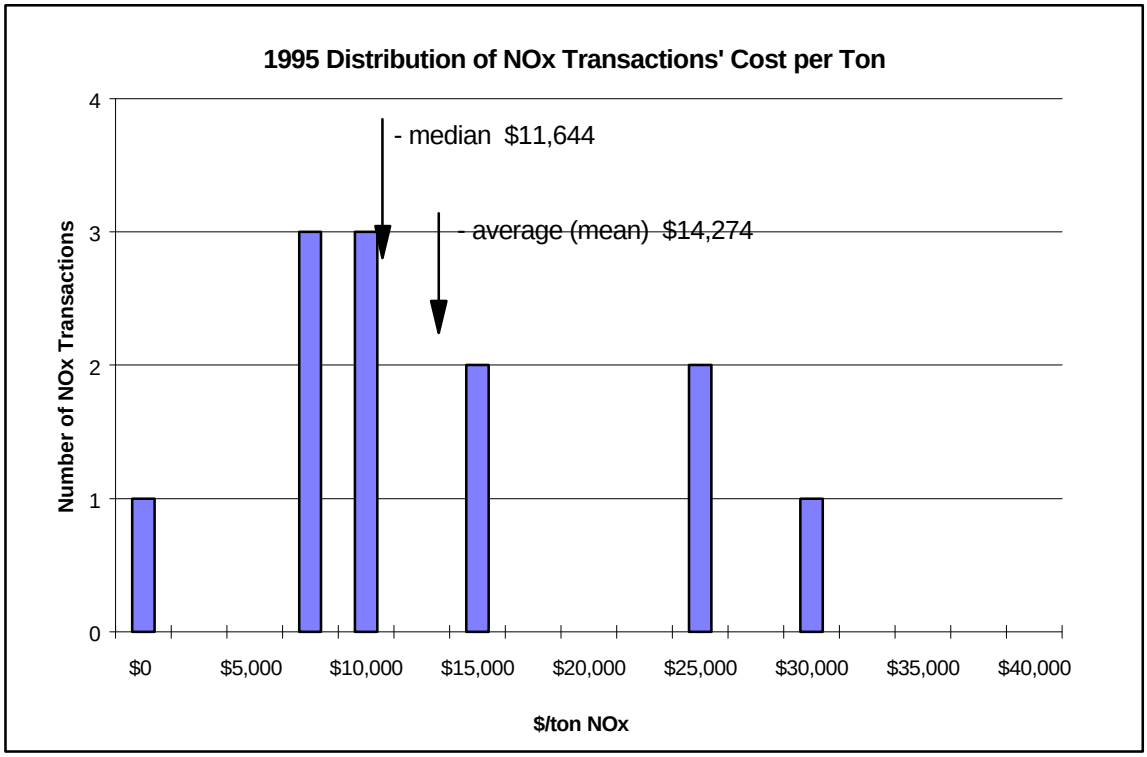


TABLE 6

HC Emission Reduction Credit Transaction Costs
Reported in Tons per Year

District	$/ton	Tons	Notes
Bay Area	$450	30	
	$6,500	33.46	
	$6,739	31.4	Credits valid for 9 month lease
	$9,344	0.25	
	$13,868	1.197	
Sacramento Metropolitan	$32,400	0.16	Mobile Barter transaction for 3 years
San Diego County	$45	93	
	$8,000	10	
	$10,000	2	
San Joaquin Valley Unified	$267	0.01	Credits valid in 4th quarter
	$5,041	32.08	
	$5,500	1	
	$5,551	0.78	
	$6,027	18.25	
	$6,575	40.84	
South Coast	$2,740	7.67	
	$6,575	0.37	
	$6,575	0.73	
	$6,575	1.83	
	$6,575	10.95	
	$8,219	2.74	
Santa Barbara County	$8,731	2.85	No limit on length of life
Ventura County	$11,000	3.46	Subsidiary Transaction
	$22,500	4.51	

TABLE 7

1995 Summary Statistics For a Total of 24 HC Transactions*

	$/ton	Tons
Total		329.537
Average (mean)	$8,158	
Median	$6,575	
High	$32,400	
Low	$45	

* Excludes subsidiary and barter transactions with no cost data.

CHART 2

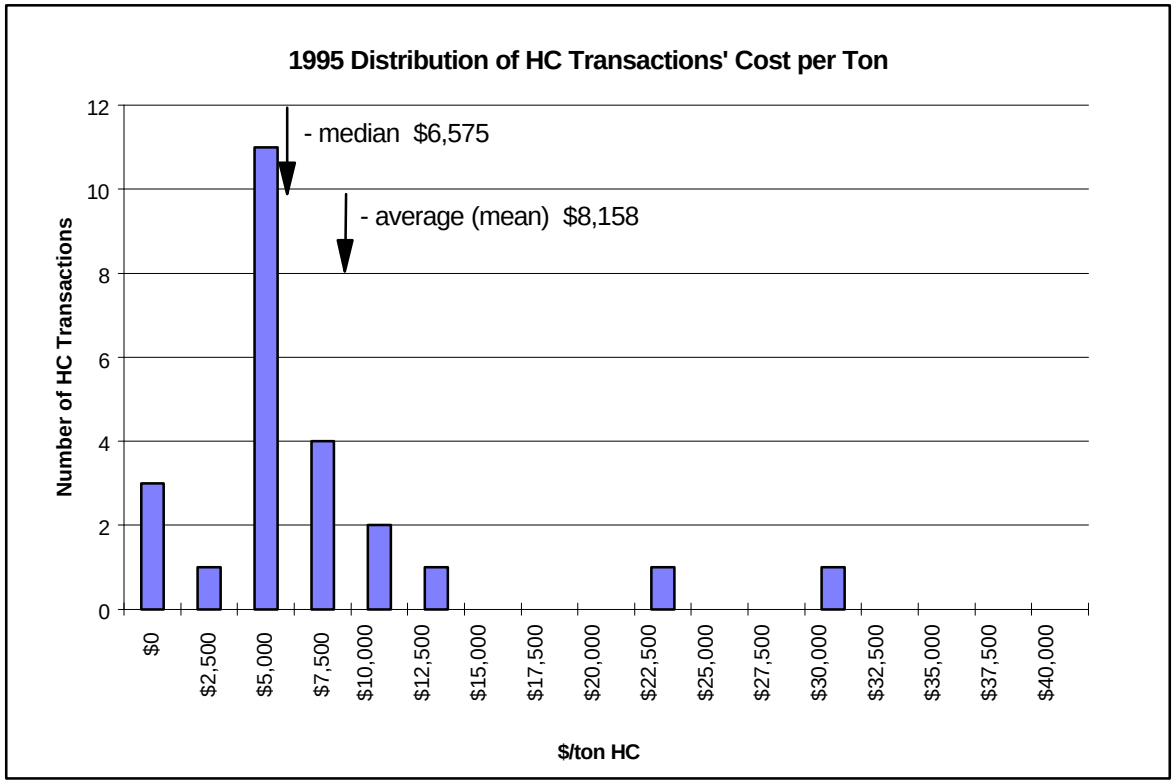


TABLE 8

1995 California

PM10, CO, and SOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
PM10 Transactions			
Placer County	$16,000	58.3	
Sacramento Metropolitan	$16,000	152.67	
San Joaquin Valley Unified	$269	14.12	Credits valid in 4th quarter
	$5,840	1	
	$5,848	0.08	
	$9,180	24.67	
CO Transactions			
San Joaquin Valley Unified	$267	0.15	Credits valid in 4th quarter
SOx Transactions			
San Joaquin Valley Unified	$5,200	33.3	

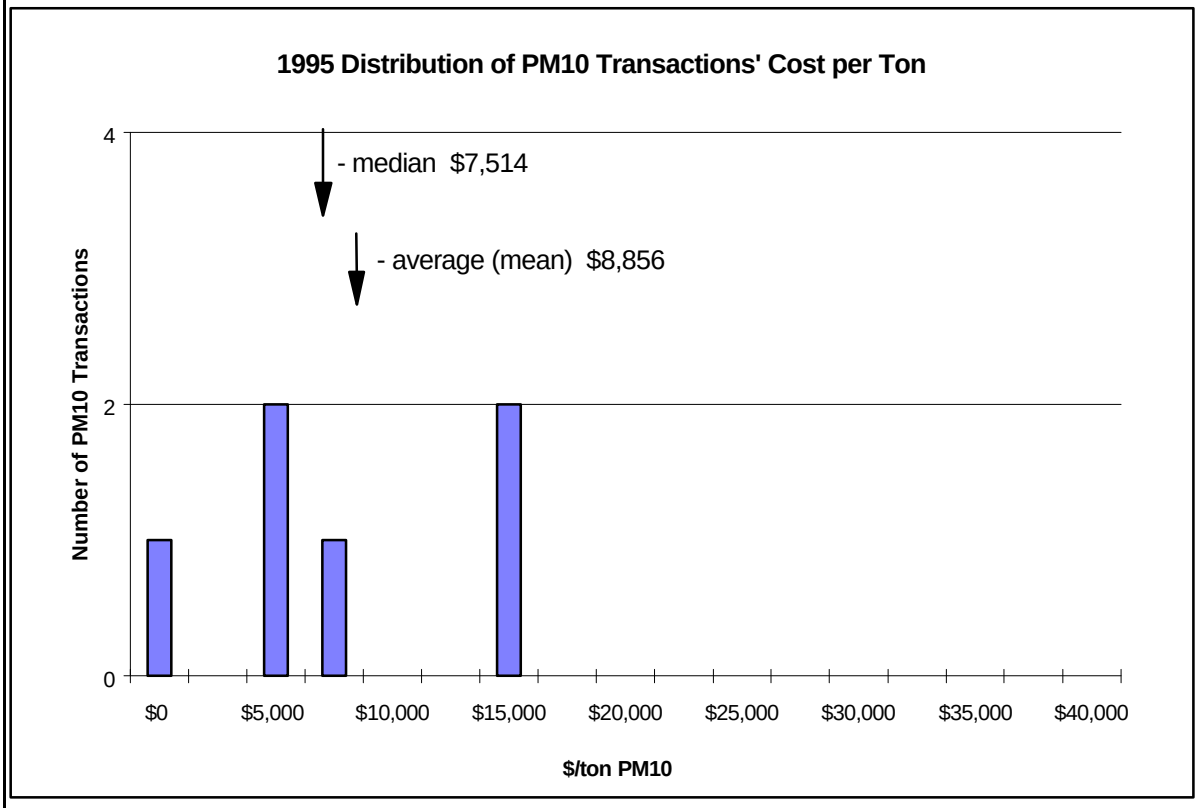
TABLE 9

1995 Summary Statistics For a Total of 6 PM10 Transactions*

	$/ton	Tons
Total		250.84
High	$16,000	
Average (mean)	$8,856	
Median	$7,514	
Low	$269	

* Excludes subsidiary and barter transactions with no cost data.

CHART 3



APPENDIX E: 1994 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF 1994 DATA

The emission reduction credits transactions reported by the districts are presented in Table 2, Table 4, Table 6, and Table 8. Each of these tables presents the cost per ton of pollutant, the total tons of pollutant traded, and additional explanatory notes. The price paid per ton is calculated by dividing the total cost of the transaction by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. All of these tables group transactions by district since credit markets, and therefore cost per ton, may vary from district to district. Districts are reported alphabetically and the districts' transactions are ordered by increasing cost per ton of pollutant. Assets transfers and subsidiary transactions do not have an associate cost and are listed at the beginning of each districts' transactions. Additionally, Table 4, Table 6, and Table 8 are grouped by and report NOx, HC, and PM10 transactions respectively.

Table 5, Table 7, and Table 9 summarize the data of each preceding table. The summary tables include the average or mean, the median, and the high and low of the price paid per ton of pollutant. (The median is the number in the middle of a set of numbers, i.e., half of the numbers have values greater than the median and half of the numbers have values less than the median.) These tables exclude subsidiary transactions and assets transfers since there is no associated cost to include in the calculations.

Chart 1, Chart 2, and Chart 3 are histograms of Tables 4, 6, and 8 respectively. (A histogram gives the cumulative frequency of data points falling within a specified range. For example, in Table 4 there are two NOx transactions between $0 and $2,499, no transactions between $2,500 and $4,999, one transactions between $5,000 and $7,499, and eleven transactions between $7,500 and $9,999. These are reflected in Chart 1.)

Table 2 presents all of the transactions taking place within a district. There were a total of 89 transactions statewide in 1994. Thirteen of the transactions involved either assets transfers or subsidiary transactions and therefore did not report a cost. Of those 76 transactions that were not assets transfers or subsidiary transactions, 33 transactions were NOx transactions, 37 were HC transactions, 5 were PM10 transactions, and 1 was a SOx transactions. All the districts reported to ARB regardless of whether they had any offset transactions. Table 3 lists the districts that reported no transactions in 1994.

As shown in Table 5, the average price per ton of NOx was $13,432; the high price per ton of NOx was $37,000 and the low was $496. The high price was a mobile source transaction;

the low price was for credits valid only 90 days. The median price per ton of NOx, which is less influence by outliers, was $10,959. As shown in Table 7, with less skewing in the data than in the NOx data, the median price of a ton of HC at $10,628 is closer to the average price per ton of HC at $11,516. The high for HC was $23,650, and the low was $4,932. Table 8 includes the cost of PM10, CO, and SOx transactions. There were only two CO transactions and two SOx transactions. Of those, only one transaction included a cost, i.e., $6,000 per ton of SOx. As shown in Table 9, with only 5 PM10 transactions, the average and median price were $14,907 and $13,496 respectively. The high PM10 price was $22,000 and the low was $8,219.

For purposes of comparison, the 1993 emission reduction credits transactions are included in the appendices.

TABLE 2

1994 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
Bay Area	HC	$5,900	53	
Total of 10 Transactions	HC	$5,950	45	
	HC	$6,500	9.233	
	HC	$6,500	10	
	HC	$8,000	2	
	HC	$8,500	0.664	
	HC	$8,500	1	
	HC	$20,000	17	
	PM10	$22,000	22.5	
	SOx	$6,000	15.1	
Feather River	NOx	$12,000	26.34	Credits valid 1st & 4th quarters
Total of 4 Transactions	NOx	$15,000	58.4	Credits valid 2nd & 3rd quarters
	HC	$12,000	0.13	Credits valid 1st & 4th quarters
	HC	$15,000	0.275	Credits valid 2nd & 3rd quarters
Sacramento Metropolitan	NOx	$8,750	4.44	
Total of 11 Transactions	NOx	$13,500	84.73	
	NOx	$37,000	39.28	
	HC	$2,000	10	
	HC	$10,628	39	
	HC	$13,500	0.4	
	HC	$14,976	5.9	
	HC	$17,500	0.18	
	HC	$18,000	170	
	HC	$22,000	100	
	PM10	$10,000	31.78	
San Diego County	HC	$15,000	5	
Total of 2 Transactions	PM10		9	Subsidiary Transaction
San Joaquin Valley Unified	NOx	$10,959	3.78	
Total of 9 Transactions	NOx	$10,959	4.44	
	NOx	$10,959	13.9	
	NOx	$13,496	31.47	
	HC	$6,027	2.38	
	HC	$6,027	0.44	
	HC	$6,575	5.37	
	HC	$10,795	6.84	
	PM10	$13,496	16.43	

TABLE 2 (cont.)

1994 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
South Coast	NOx		1.28	Assets Transfer
Total of 40 Transactions	NOx		2.92	Assets Transfer
	NOx		8.21	Subsidiary Transaction
	NOx		10.59	Assets Transfer
	NOx		60.41	Subsidiary Transaction
	NOx	$496	42.34	90 days
	NOx	$496	42.34	90 days
	NOx	$5,479	35.04	
	NOx	$8,767	11.32	
	NOx	$9,315	4.02	
	NOx	$9,315	5.84	
	NOx	$9,315	6.75	
	NOx	$9,589	49.28	
	NOx	$9,863	8.21	
	NOx	$9,863	8.4	
	NOx	$9,863	11.5	
	NOx	$9,863	20.08	
	NOx	$9,863	31.94	
	NOx	$10,137	5.11	
	NOx	$10,640	18.8	
	NOx	$12,329	4.75	
	NOx	$12,603	25.55	
	NOx	$13,699	20.08	
	NOx	$36,977	6.39	Mobile source (1)
	HC		0.18	Assets Transfer
	HC		1.46	Subsidiary Transaction
	HC	$4,932	9.31	
	HC	$5,479	10.22	
	HC	$5,753	1.28	
	HC	$6,575	2.74	
	HC	$6,986	20.81	
	HC	$7,397	5.48	
	HC	$10,959	1.64	
	HC	$11,781	25.19	
	PM10		1.46	Subsidiary Transaction
	PM10	$8,219	18.62	
	PM10	$20,822	8.94	
	CO		0.18	Subsidiary Transaction
	CO		83.95	Assets Transfer
	SOx		0.37	Assets Transfer

(1) Clean fueled buses, length of ERC life is 12 years or life of the bus, whichever is shorter.

TABLE 2 (cont.)

1994 California

Emission Reduction Credit Transaction Costs By District

Reported in Tons per Year

District	Pollutant	$/ton	Tons	Notes
Ventura County Total of 13 Transactions	NOx	$20,000	0.3	2 year lease
	NOx	$21,000	0.37	
	NOx	$23,650	1	
	NOx	$23,750	9.63	
	NOx	$23,750	9.63	
	HC		0.11	Subsidiary Transaction
	HC	$9,250	6.86	
	HC	$10,957	0.35	
	HC	$15,000	2.5	
	HC	$22,500	0.1	
	HC	$22,500	2.2	
	HC	$22,500	4.51	
	HC	$23,650	1	

TABLE 3

Districts With No Offset Transactions to Report in 1994

Amador County Air Pollution Control District
Butte County Air Pollution Control District
Calaveras County Air Pollution Control District
Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District
Glenn County Air Pollution Control District
Great Basin Unified Air Pollution Control District
Imperial County Air Pollution Control District
Kern County Air Pollution Control District
Lake County Air Quality Management District
Lassen County Air Pollution Control District
Mariposa County Air Pollution Control District
Mendocino County Air Pollution Control District
Modoc County Air Pollution Control District
Mojave Desert Air Quality Management District
Monterery Bay Unified Air Pollution Control District
North Coast Unified Air Quality Management District
Northern Sierra Air Quality Management District
Northern Sonoma County Air Pollution Control District
Placer County Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Santa Barbara County Air Pollution Control District
Shasta County Air Pollution Control District
Siskiyou County Air Pollution Control District
Tehama County Air Pollution Control District
Tuolumne County Air Pollution Control District
Yolo-Solano Air Pollution Control District

TABLE 4

1994 California

NOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
Feather River	$12,000	26.34	Credits valid 1st & 4th quarters
	$15,000	58.4	Credits valid 2nd & 3rd quarters
Sacramento Metropolitan	$8,750	4.44	
	$13,500	84.73	
	$37,000	39.28	
San Joaquin	$10,959	3.78	
	$10,959	4.44	
	$10,959	13.9	
	$13,496	31.47	
South Coast		1.28	Assets Transfer
		2.92	Assets Transfer
		8.21	Subsidiary Transaction
		10.59	Assets Transfer
		60.41	Subsidiary Transaction
	$496	42.34	90 days
	$496	42.34	90 days
	$5,479	35.04	
	$8,767	11.32	
	$9,315	4.02	
	$9,315	5.84	
	$9,315	6.75	
	$9,589	49.28	
	$9,863	8.21	
	$9,863	8.4	
	$9,863	11.5	
	$9,863	20.08	
	$9,863	31.94	
	$10,137	5.11	
	$10,640	18.8	
	$12,329	4.75	
	$12,603	25.55	
	$13,699	20.08	
	$36,977	6.39	Mobile source; clean fueled buses (1)
Ventura County	$20,000	0.3	2 year lease
	$21,000	0.37	
	$23,650	1	
	$23,750	9.63	
	$23,750	9.63	

(1) The length of the ERC life is 12 years or the life of the bus, whichever is shorter.

TABLE 5

1994 Summary Statistics For a Total of 33 NOx Transactions*

	$/ton	Tons
Total		645.45
Average (mean)	$13,432	
Median	$10,959	
High	$37,000	
Low	$496	

* Excludes subsidiary transactions and asset transfers.

CHART 1

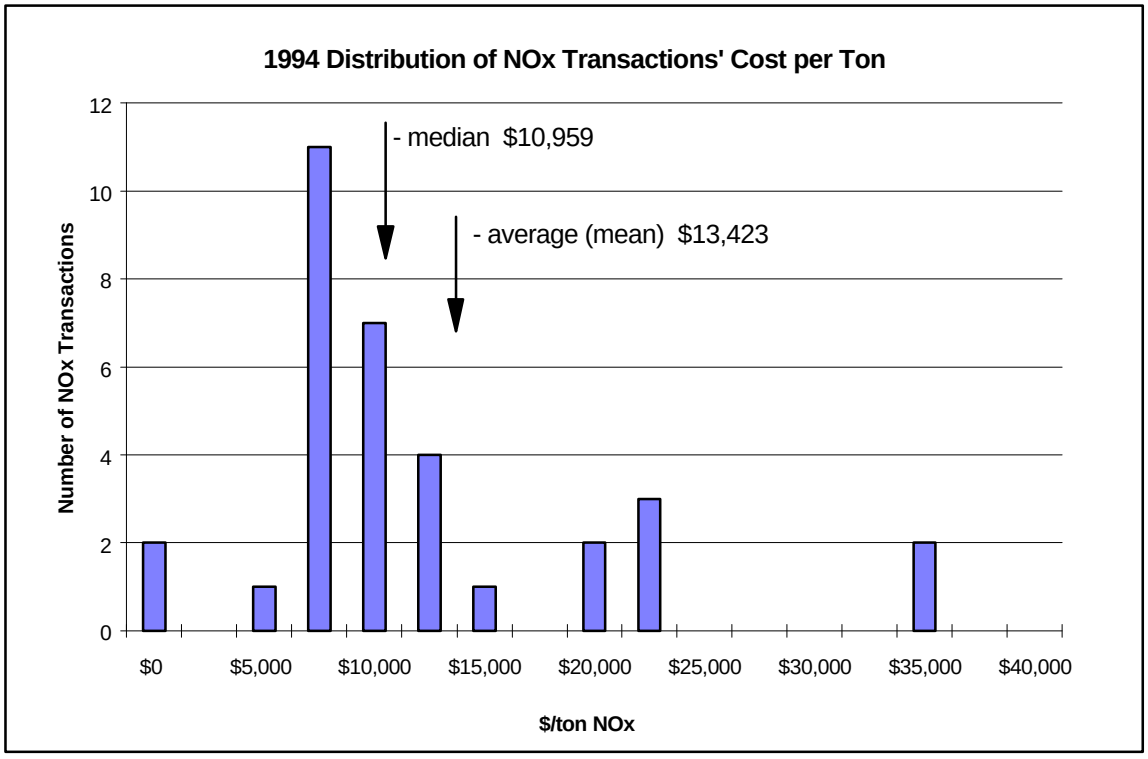


TABLE 6

1994 California

HC Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
Bay Area	$5,900	53	
	$5,950	45	
	$6,500	9.233	
	$6,500	10	
	$8,000	2	
	$8,500	0.664	
	$8,500	1	
	$20,000	17	
Feather River	$12,000	0.13	Credits valid 1st & 4th quarters
	$15,000	0.275	Credits valid 2nd & 3rd quarters
Sacramento Metropolitan	$2,000	10	
	$10,628	39	
	$13,500	0.4	
	$14,976	5.9	
	$17,500	0.18	
	$18,000	170	
	$22,000	100	
San Diego County	$15,000	5	
San Joaquin Valley Unified	$6,027	2.38	
	$6,027	0.44	
	$6,575	5.37	
	$10,795	6.84	
South Coast		0.18	Assets Transfer
		1.46	Subsidiary Transaction
	$4,932	9.31	
	$5,479	10.22	
	$5,753	1.28	
	$6,575	2.74	
	$6,986	20.81	
	$7,397	5.48	
	$10,959	1.64	
	$11,781	25.19	
Ventura County		0.11	Subsidiary Transaction
	$9,250	6.86	
	$10,957	0.35	
	$15,000	2.5	
	$22,500	0.1	
	$22,500	2.2	
	$22,500	4.51	
	$23,650	1	

TABLE 7

1994 Summary Statistics For a Total of 37 HC Transactions*

	$/ton	Tons
Total		578.002
Average (mean)	$11,516	
Median	$10,628	
High	$23,650	
Low	$4,932	

* Excludes subsidiary transactions and asset transfers.

CHART 2

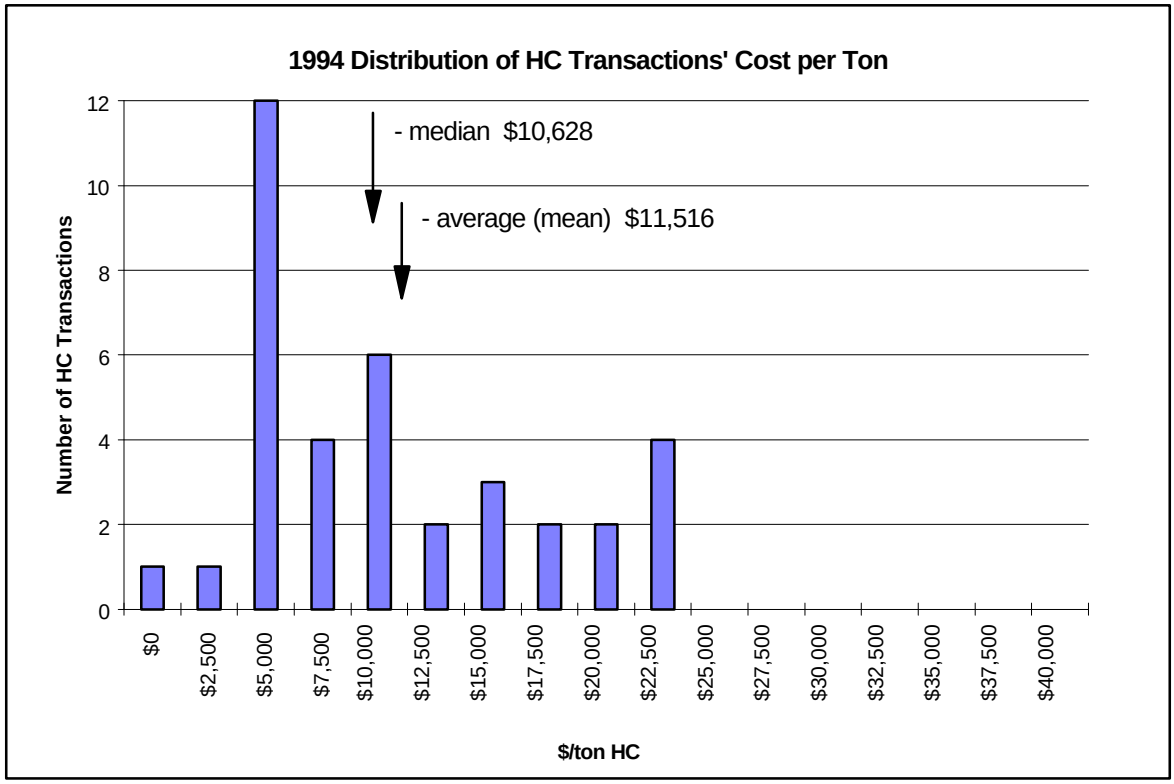


TABLE 8

1994 California

PM10, CO, and SOx Emission Reduction Credit Transaction Costs

Reported in Tons per Year

District	$/ton	Tons	Notes
PM10 Transactions			
Bay Area	$22,000	22.5	
Sacramento Metropolitan	$10,000	31.78	
San Diego		9	Subsidiary Transaction
San Joaquin Valley Unified	$13,496	16.43	
South Coast		1.46	Subsidiary Transaction
	$8,219	18.62	
	$20,822	8.94	
CO Transactions			
South Coast		0.18	Subsidiary Transaction
		83.95	Assets Transfer
SOx Transactions			
Bay Area	$6,000	15.1	
South Coast		0.37	Assets Transfer

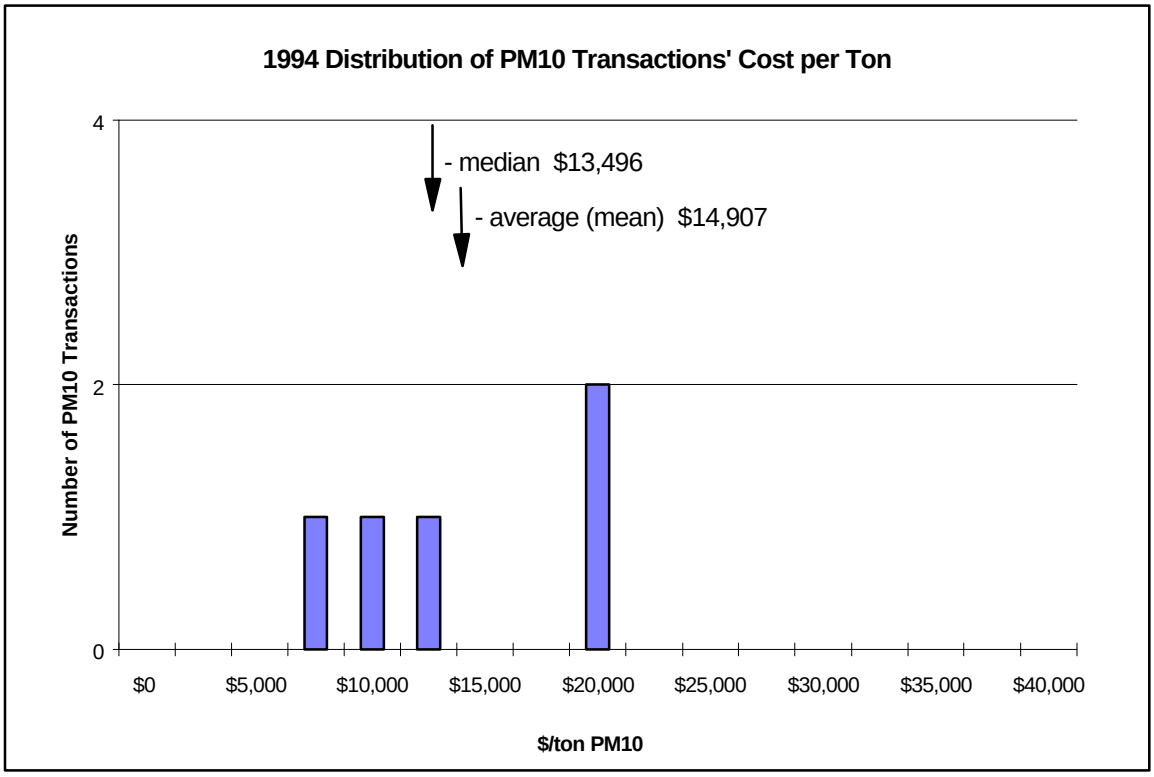
TABLE 9

1994 Summary Statistics For a Total of 5 PM10 Transactions*

	$/ton	Tons
Total		98.27
High	$22,000	
Average (mean)	$14,907	
Median	$13,496	
Low	$8,219	

* Excludes subsidiary transactions and asset transfers.

CHART 3



APPENDIX F: 1993 EMISSION REDUCTION CREDIT COSTS

DESCRIPTION OF DATA

The information reported in the Table A, the summary of transactions, includes, for each transaction, the total tons per year of pollutant traded, the price per ton paid and the pollutant traded. The price paid per ton is a straight calculation of the total cost of the transaction divided by the total tons traded. There is no assumption made about the number of years of operation of the facility or how the payment schedule is arranged. Table A shows the districts with offset transactions in alphabetical order. All the districts reported to ARB regardless of whether they had any offset transactions.

For each pollutant the "tons" column contains the total tons per year traded in the transaction. The "$/ton" column is the price paid per ton. To calculate the total cost of the transaction, multiply the tons by the $/ton. Average price paid statewide is given at the bottom of Table 2 as well as the total tons traded in 1993.

Table A shows a range of offset prices for Oxides of Nitrogen (NOx) of $6,500 to $25,000 per ton per year and an average price of $16,539. There were 9 NOx transactions throughout California. The range of prices for Oxides of Sulfur (SOx) was $4,109 to $5,500 with an average price of $5,010. There were 5 SOx transactions in 1993. The range of prices for Particulate Matter (PM) trades was $10,000 to $25,000, with an average of $17,654 paid for a ton of pollutant. There were 7 PM trades made. Hydrocarbons (HC) trades ranged in price from $6,500 to $37,150 with an average price of $12,742. HC trades were the most prevalent with 18 trades made in 1993. Although Carbon Monoxide (CO) is a tradeable pollutant, there were no trades of CO in 1993.

TABLE A

Emission Reduction Credit Transaction Costs in California in 1993

Reported in Tons per Year

District	*NOx*		*SOx*		*PM*		*HC*	
	Tons	*$/Ton*	*Tons*	*$/ton*	*Tons*	*$/Ton*	*Tons*	*$/Ton*
Bay Area	17.3	$9,460						
	144.9	$20,000						
	48.96	n/a (1)						
	1.9	$6,500						
			43.9	$5,500				
			55	$5,500				
					9.28	$10,000		
							7.33	$6,500
							5	$9,600
							3.1	$8,870
							61.7	$9,977
							2.61	n/a (1)
Sacramento	12.1	$25,000						
Metropolitan					7.4	$25,000		
							75.3	$37,150
							7.8	$12,500
San Joaquin	58	$12,062						
Valley	6	$23,643						
							3.5	$12,060
							6	$6,050
							15.5	$6,027
							65.7	$6,030
South Coast	26.46	$13,151						
			91.25	$4,932				
			77.2	$4,110				
			78.5	n/a (2)				
					2.56	$21,918		
					25.55	$13,699		
					0.18	n/a (3)		
							268.3	$8,767
							11.9	n/a (4)
							3.1	n/a (5)
							54.75	$9,863
							3.8	n/a (3)
Ventura County	15	$22,500						
							0.01	$22,500
							0.33	$22,500
Range of Prices:								
High		$25,000		$5,500		$25,000		$37,150
Low		$6,500		$4,110		$10,000		$6,027
Average Price Paid		**$16,539**		**$5,010**		**$17,654**		**$12,742**
Total Tons Statewide	**330.62**		**345.85**		**44.97**		**595.73**	

Note: 1. **Offsets traded for steam, no transaction cost reported.**

Note: 2. **Transaction was not a purchase-and-sale transaction, no purchase price available.**

Note: 3. **Buyer purchase all assets and emission rights from seller, no transaction cost available.**

Note: 4. **Buyer owns seller, no transaction cost available.**

Note: 5. **Company liquidated and formed under a new name, no transaction cost available.**

APPENDIX G: AB 3785 (Quackenbush, 1992)

Assembly Bill No. 3785

CHAPTER 612

An act to amend Section 6254.7 of the Government Code, and to amend Sections 40709 and 40709.5 of the Health and Safety Code, relating to air pollution.

[Approved by Governor September 8, 1992. Filed with Secretary of State September 9, 1992.]

LEGISLATIVE COUNSEL'S DIGEST

AB 3785, Quackenbush. Air pollution.

(1) Existing law provides that air pollution emission data are public records, and data used to calculate emission data are not public records.

This bill would prescribe the circumstances when data used to calculate the costs of obtaining emissions offsets are, or are not, public records. The bill would require certain air pollution control districts and air quality management districts to annually publish the cost of emission offsets purchased, thereby imposing a state-mandated local program.

(2) Existing law authorizes air pollution control districts and air quality management districts to establish a system by which reductions in air contaminant emissions may be banked and used to offset future emission increases.

This bill would require the adoption of that system, thereby imposing a state-mandated local program.

(3) Existing law required the state board to establish a technical review group and required the technical review group to report to the state board by January 1, 1989, regarding the emission credit system and emission offset requirements.

This bill would delete those provisions.

(4) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by

this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. Section 6254.7 of the Government Code is amended to read:

6254.7. (a) All information, analyses, plans, or specifications that disclose the nature, extent, quantity, or degree of air contaminants or other pollution which any article, machine, equipment, or other contrivance will produce, which any air pollution control district or air quality management district, or any other state or local agency or district, requires any applicant to provide before the applicant builds, erects, alters, replaces, operates, sells, rents, or uses the article, machine, equipment, or other contrivance, are public records.

(b) All air or other pollution monitoring data, including data compiled from stationary sources, are public records.

(c) All records of notices and orders directed to the owner of any building of violations of housing or building codes, ordinances, statutes, or regulations which constitute violations of standards provided in Section 1941.1 of the Civil Code, and records of subsequent action with respect to those notices and orders, are public records.

(d) Except as otherwise provided in subdivision (e) and Chapter 3 (commencing with Section 99150) of Part 65 of the Education Code, trade secrets are not public records under this section. "Trade secrets," as used in this section, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

(e) Notwithstanding any other provision of law, all air pollution emission data, including those emission data which constitute trade secrets as defined in subdivision (d), are public records. Data used to calculate emission data are not emission data for the purposes of this subdivision and data which constitute trade secrets and which are used to calculate emission

data are not public records.

(f) Data used to calculate the costs of obtaining emissions offsets are not public records. At the time that an air pollution control district or air quality management district issues a permit to construct to an applicant who is required to obtain offsets pursuant to district rules and regulations, data obtained from the applicant consisting of the year the offset transaction occurred, the amount of offsets purchased, by pollutant, and the total cost, by pollutant, of the offsets purchased is a public record. If an application is denied, the data shall not be a public record.

SEC. 2. Section 40709 of the Health and Safety Code is amended to read:

40709. (a) Every district board shall establish by regulation a system by which all reductions in the emission of air contaminants which are to be used to offset certain future increases in the emission of air contaminants shall be banked prior to use to offset future increases in emissions. The system shall provide that only those reductions in the emission of air contaminants which are not otherwise required by any federal, state, or district law, rule, order, permit, or regulation shall be registered, certified, or otherwise approved by the district air pollution control officer before they may be banked and to offset future increases in the emission of air contaminants. The system shall be subject to disapproval by the state board pursuant to Chapter 1 (commencing with Section 41500) of Part 4 within 60 days after adoption by the district).

(b) The system is not intended to recognize any pre-existing right to emit air contaminants, but to provide a mechanism for districts to recognize the existence of reductions of air contaminants that can be used as offsets, and to provide greater certainty that the offsets shall be available for emitting industries.

(c) Notwithstanding subdivision (a), emissions reductions proposed to offset simultaneous emissions increases within the same stationary source need not be banked prior to use as offsets, if those reductions satisfy all criteria established by regulation pursuant to subdivision (a).

SEC. 3. Section 40709.5 of the Health and Safety Code is amended to read:

40709.5. Any district which has established a system pursuant to Section 40709 by which reductions in emissions may be banked or otherwise credited to offset future increases in the emissions of air contaminants, or which utilize a calculation method which enables internal emission reductions to be credited against increases in emissions, and as of January 1, 1988, is within a federally designated nonattainment area for one or more air pollutants, shall develop and implement a program which, at a minimum, provides for all of the following:

(a) Identification and tracking of sources possessing emission credit balances accruing from the elimination or replacement of older, higher emitting equipment.

(b) Periodic analysis of the increases or decreases in emissions which occur when credits are used to bring new or modified emission sources into operation.

(c) Procedures for verifying the emission reductions credited to the bank or accruing to internal accounts, and for adjusting of credited emissions based on current district requirements.

(d) Periodic evaluation of the extent to which the system has contributed or detracted from the goal of allowing economic growth and modification of existing facilities, and has

contributed to or detracted from the district's progress toward attainment of ambient air quality standards.

(e) Annual publication of the costs, in dollars per ton, of emission offsets purchased for new or modified emission sources, excluding information on the identity of any party involved in the offset transactions. This publication shall specify, for each offset purchase transaction, the year the offset transaction occurred, the amount of offsets purchased, by pollutant, and the total cost, by pollutant, of the offsets purchased. Each application to use emissions reductions banked in a system established pursuant to Section 40709 shall provide sufficient information, as determined by the district, to perform the cost analysis. The information shall be a public record.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act. Notwithstanding Section 17580 of the Government Code, unless

otherwise specified in this act, the provisions of this act shall become operative on the same date that the act takes effect pursuant to the California Constitution.

APPENDIX H: REPORTING FORM AND INSTRUCTIONS

Annual Emission Reduction Credit Transaction Report Instructions

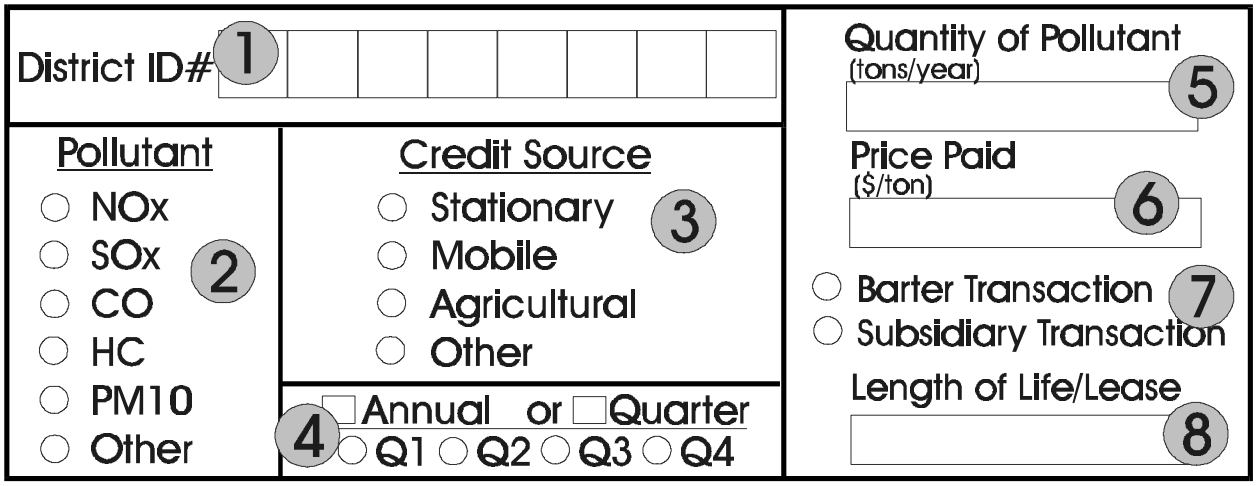
General:

1. One transaction record per pollutant should be filled out for each transaction which takes place in the district between two or more parties.

2. Transactions should be reported in the year in which the final transaction occurs and money, or barter agreements are exchanged.

3. The annual report should be submitted to the Air Resources Board no later than January 31 of each year. The Air Resources Board will compile all data from the districts and publish a statewide report on the cost of offsets by the following April.

4. For cases of offset transactions which occur across district boundaries, transactions should be reported in the district in which the offsets are used. This is the district which will most likely have access to the transaction cost information necessary for reporting.



District ID# | | | | | | | | |

Pollutant
- ○ NOx
- ○ SOx
- ○ CO
- ○ HC
- ○ PM10
- ○ Other

Credit Source
- ○ Stationary
- ○ Mobile
- ○ Agricultural
- ○ Other

☐ Annual or ☐ Quarter
○ Q1 ○ Q2 ○ Q3 ○ Q4

Quantity of Pollutant (tons/year)

Price Paid ($/ton)

○ Barter Transaction
○ Subsidiary Transaction

Length of Life/Lease

District ID# | | | | | | | | |

Pollutant
- ○ NOx
- ○ SOx
- ○ CO
- ○ HC
- ○ PM10
- ○ Other

Credit Source
- ○ Stationary
- ○ Mobile
- ○ Agricultural
- ○ Other

☐ Annual or ☐ Quarter
○ Q1 ○ Q2 ○ Q3 ○ Q4

Quantity of Pollutant (tons/year)

Price Paid ($/ton)

○ Barter Transaction
○ Subsidiary Transaction

Length of Life/Lease

District ID# | | | | | | | | |

Pollutant
- ○ NOx
- ○ SOx
- ○ CO
- ○ HC
- ○ PM10
- ○ Other

Credit Source
- ○ Stationary
- ○ Mobile
- ○ Agricultural
- ○ Other

☐ Annual or ☐ Quarter
○ Q1 ○ Q2 ○ Q3 ○ Q4

Quantity of Pollutant (tons/year)

Price Paid ($/ton)

○ Barter Transaction
○ Subsidiary Transaction

Length of Life/Lease

1. **District ID #** The district ID # should be in the format:

AAYYXXX

Where AA is a two letter district code (a list of district codes is attached), YY is a two digit year identifier (e.g. 95 for 1995), and XXX is a three-digit transaction number from 001 to 999.

This ID number will only be used to track the origin of data and for data validation. The assignment of a transaction number will ensure quality control of data transfer between the district and the Air Resources Board. Individual transactions will not be identified in Air Resources Board summary reports.

2. **Pollutant** Please check one pollutant per transaction. If trade involved more than one pollutant, use separate transaction records for each pollutant traded. HC is equivalent to other acronyms used for hydrocarbons such as POC, ROC, ROG and VOC.

3. **Credit Source** Please indicate the source of emission reduction credits (ERC). This information will aid in the analysis of ERC prices paid. Stationary source credits typically do not have a finite useful life, whereas mobile and agricultural source ERCs have specific limiting conditions which limit useful life. It is important that a distinction be made between these kinds of offsets when analyzing the cost of offsets.

4. **Annual/Quarter:** Please indicate if credits are valid on an annual basis or quarterly. Additionally, if credits are valid quarterly, indicate which quarter they can be used for. This applies to seasonal credits or credits that are only valid in a specific quarter.

5. **Quantity of Pollutant** Regardless of district recording practices or the transaction agreement, please give the quantity of pollutant in tons/year.

Example 1: For Single Quarter Transactions

$$1\frac{lb}{day}\ 1\frac{lb}{day} X 365\frac{days}{year} X \frac{1}{2000}\frac{ton}{lbs}\ 0.1825\frac{tons}{year}$$

Example 2: For Annual Transactions

$$1\frac{lb}{quarter}\ 1\frac{lb}{quarter} X 4\frac{quarters}{year} X \frac{1}{2000}\frac{ton}{lbs}\ 0.0020\frac{tons}{year}$$

Example 3: For Quarterly Credits Used to Offset Annual Sources

$$(Q_1\ Q_2\ Q_3\ Q_4)\ \frac{lbs}{year}$$ Convert to tons per year

6. **Price Paid** This is the bottom line price paid by the purchaser to the owner of the credit. Government Code Section 6254.7 authorizes the district to obtain this information from applicants. Net present value should not be calculated for lease transactions. If price is given in dollars per pound, please convert to dollars per ton by multiplying by 2000 lb/ton.

7. **Barter and Subsidiary Transactions** If barter was involved and/or no money was exchanged for the offsets, the district should request the applicant to calculate a dollars/ton value for the credit transaction. Barters can include one company (A) placing controls on another (B) to generate credits. The price paid should then reflect what company A paid to install equipment on company B and any additional fees paid to company B as part of the agreement. The price paid for offsets should be the value of the offset at the time of the transaction.

   If transaction occurred between two subsidiaries of the same parent company check the subsidiary transaction box. This also applies to transactions which occur between agencies of the same governmental system for example between two agencies of the county. Since the price charged in barter and subsidiary transactions may not reflect the market value of credits, this information will be helpful in analyzing prices paid for credits.

8. **Length of Use/Lease** Please indicate the valid length of credit life for this transaction. This applies to stationary source credits that are sold as a limited life lease agreement, or to other types of credit which have a finite useful life. If no limit is placed on the useful life, leave this box blank.